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Editorial Notes

AS we near the end of our first decade, it is natural to look both forwards and backwards. The habit of reminiscence is a recognized sign of age, but we will spare our readers until our next, the fortieth, number, when we propose to tell them something about the origins of ANTIQUITY. Fortunately its founder had sufficient faith in its future, even before the first number had appeared or even been discussed, to jot down from time to time notes on the development of the idea, and a few of the more important dates.

Who knows what the next decade holds in store for us ? Certainly not the scientific worker who demands only to be given the means of carrying on his researches for the advancement of knowledge. The work he does may be organized on a national basis and his problems may present themselves under a national guise ; that is merely fortuitous. It is necessary to concentrate upon a limited region (or subject) in order to achieve results, and in many instances the region selected is one's own country or part of it. But no one knows better than the archaeologist how dependent he is upon the workers in another region. One of the difficulties encountered in ' megalithic ' research, for instance, is the relative backwardness of the workers in adjacent regions, such as Ireland, Brittany and the Iberian peninsula. That backwardness is being remedied, particularly in Northern Ireland, where an active group is at work ; but it will remain somewhat of a handicap for many

years to come. Even the most bigoted nationalist must admit this mutual interdependence, and does so in practice. But the advance of knowledge here is conditioned by the pace of the slowest.

Then, again, the organization of what is called international research is impeded by those recent but obsolete obstructions—independent sovereign States. Recent they are, judged by the time-scale of history and archaeology, which is marked off in centuries and millennia ; and obsolete because they bear no relation to the means of production and transport that scientists have created. To the archaeologist, national frontiers are a temporary phenomenon of no more importance, and no less, than those other frontiers, political and military, which he meets with from time to time in his researches. Sometimes he abuses them as unmitigated nuisances—when, for instance he comes across a distribution-map of some type of prehistoric object—sword, brooch or pot—that stops short at some national frontier. What we all want to know, of course, is the *total extent* of its distribution. Its range over a political region that had no existence at the time is meaningless, and the evidence, presented in this way, may even convey a false impression. To some extent the student must be bound and confined within such limitations, so long as they exist ; but he should never allow himself to be dominated by them.

These remarks apply mainly to the individual worker. When we come to consider co-operative research, the difficulties can only be realized by those who have made a resolute effort in that direction. The whole trend of modern science is towards undertakings that involve international co-operation. Meteorology and astronomy are perhaps the best instances. The organization of science has outstripped the political and social organization of most of the world which still holds it in bondage.

The late Professor Haverfield, in his articles in the Victoria County History of England, kept reminding his readers that to speak of ' Roman Hampshire ' or ' Roman Worcestershire ' was an absurd anachronism, for such entities had no existence in Roman times. They may be

adopted as necessary units of study, but no more. Let us for a moment suppose that Britain is still divided up into kingdoms, and that some one sets out to compile a map of Roman Britain—a perfectly legitimate aim, for Britain is an island, and was formerly a single province of the Roman Empire. The organizer may be supposed to be a subject of the Kingdom of Wessex : he has to obtain the co-operation of his colleagues in the adjacent Kingdoms, and they are all anxious to collaborate. Their activities, however, are restricted and to some extent coloured by the policies of their respective governments. Mercia adopts the scheme with enthusiasm, so far as Mercia is concerned, but for political reasons cannot collaborate with East Anglia, portions of whose territory are included upon the sheets allotted to Mercia. Kent is slow to act and suspicious of all that emanates from Wessex. Northumbria lay for the most part beyond the effective Roman frontier, and is for the moment inordinately proud of the fact ; consequently the project has no propaganda value and is adopted without enthusiasm. Wales is in the throes of recurrent revolutions ; Cornwall has no archaeologists, and Scotland no maps. (We hope no one will quote these remarks out of their context !).

We have now almost forgotten the parochial patriotisms of the Heptarchy, though they were real enough in their time. We forget that Great Britain has been a single political unit for barely more than a couple of centuries, and that some of the most vocal nations of Europe are still younger. The mere supposition (as above) that our own regional animosities still existed is enough to make them appear absurd. Perhaps some future Editor of this Review, endowed with ampler scope and greater freedom of expression, will be able to set down plainly, as a matter of history, what has now to be told in the form of a parable. We commend it to him, whoever he may be, as a subject for the Editorial Notes of the hundredth or thousandth number !

So far as the policy of this journal is concerned we have consistently tried to disregard national bias both in the selection of articles and in the expression of opinion. Being human, we have not always succeeded. But we do claim that we try always to act in what we believe to be the interests of science and of our readers. Our standard of judgment

is scientific worth, not national ballyhoo. We have not hesitated to criticize the short-comings of British institutions when we have thought such criticism was needed—in the matter of the organization of research and museums, for instance. On the other hand, we have tried to do justice, and get justice done to the very real achievements of our fellow-countrymen whenever we think they deserve it.

Professor R. G. Collingwood writes (from 15 Belbroughton Road, Oxford) :—

' Since Professor Haverfield's death, his project for a complete *corpus* of Roman inscriptions in this country has been going forward. Most of the inscriptions have been re-read and drawn by myself ; much new material has been added ; and arrangements for publication have been made with the Clarendon Press. The collecting of materials is now almost at an end. During the present year a final search is to be made for inscriptions not yet collected. To help in organizing this search three clearing-houses have been establishd. For England, south of a line joining Gloucester to the Wash, the collector is Mr C. E. Stevens, Magdalen College, Oxford ; for everything north of that line, Mr E. B. Birley, Chesterholm, Bardon Mill, Northumberland ; for Wales, Mr. V. E. Nash-Williams, National Museum of Wales, Cardiff. If any one reading this announcement knows of Roman inscriptions in private possession or in out-of-the-way places where they are likely to have escaped search hitherto, he is invited to communicate with the appropriate collector, and any information he can send will be gratefully welcomed. Every inscription of Roman date is wanted, except the following three classes : (1) coins, (2) makers' names stamped on Samian ware, (3) inscriptions brought from foreign countries by travellers in modern times '.

We hope that any reader of these lines who can help will do so. Here at any rate is an undertaking where co-operation is easy, and where a minimum of effort may yield a maximum of result.

Origin and Early Diffusion of the Traction-plough

by Carl Whiting Bishop

Freer Gallery of Art, Washington

THE earlier efforts of mankind to assure an abundance of food consisted largely in the performance of magical ceremonies, frequently orgiastic in character. It is sometimes forgotten that such methods, even after regular cultivation had come into being, long continued to survive in close association with what we should consider more rational procedures. Yet this is a fact which we need to keep steadily in mind while we try to work out the early history of the traction-plough, which here refers to ploughs drawn by animals, especially those of the ox-kind.

Certain members of the genus *Panicum*—the millets—seem to have been the first cereals actually cultivated. These, grown with the aid of the hoe and the digging-stick under the *jhūm* system of tillage, had spread over a large part of the Eastern Hemisphere before the close of Neolithic times. Under this system, small plots of ground are cleared, often with the aid of fire, and are then tilled for two or three years until their fertility has been exhausted, when they are abandoned.

It was not, however, the growing of millet but rather that of wheat and barley which became associated with the development and diffusion of true agriculture. The first steps in this process had already been taken long before the dawn of history—possibly even before the end of the Epipalaeolithic period.[1] Hand in hand with the greater stabilization thus gradually brought about in the food supply there went a corresponding increase of efficiency in the instruments employed in its production. Of these, the hoe and the pick have never undergone improvement save in matters of detail ; in principle they remain today what they were in prehistoric times. To regard either of them as *directly*

[1] E. Cecil Curwen, ' Agriculture and the Flint Sickle in Palestine ', Antiquity, 1935, ix, 62.

ancestral to the plough is to be misled by superficial resemblances in non-essentials.[2] For example, the hoe-handle can scarcely have been the origin of the plough-beam ; for the latter, as we shall see, appears to have been absent in the earlier ploughs, its place being taken by a rope.

It was quite otherwise with that archaic implement, the digging-stick. This in time developed into the foot-plough, which assumed a variety of forms, either curved or else bent at an obtuse angle, and provided with a rest against which the cultivator pressed with his foot. Possibly the ' shoe-last celts ', characteristic of the Central European culture known as Danubian I, were in some instances at least the shares of prehistoric foot-ploughs.[3] In regions as far apart as Ireland, China, and even Peru, men using implements of this class have worked in pairs abreast, walking backward, their belief being that in this way they can accomplish much more than when acting independently.[4] Such instruments are still employed in parts of the British Isles, the Sudan, the Far East, and elsewhere.

A further step in the direction of more effective tillage was the application of the principle of traction. By this method, while one individual pushed the implement, one or more others pulled it with cords.[5] This practice likewise attained a wide distribution. It appears

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[2] In the *Méms. Soc. Royale des Antiquaires du Nord*, 1902, Sophus Müller, ' Charrue, joug, et mors ', p. 39, points out that the earlier Egyptian hoes differ more from the contemporary ploughs than do later ones.

Berthold Laufer, *Jade*, 1912, p. 48, and Paul Leser, *Entstehung und Verbreitung des Pfluges*, 1931, p. 558 and note 29, both regard the hoe and the plough as possessing different histories.

[3] V. Gordon Childe, *The Dawn of European Civilization*, 1925, pp. 66 and 172 ; *cf.* the lower example in fig. 77, p. 172 ; see also the same author, *The Danube in Prehistory*, 1929, pp. 40, 45.

[4] For an account of the Peruvian *taclla*, see the *Smithsonian Report*, 1918 (publ. 1920) : O. F. Cook, ' Foot-plough Agriculture in Peru ', pp. 487–91. In view of the striking similarity of the *taclla* to certain western European implements, it may have been introduced into South America by the Spanish, as we know was the case with the traction-plough itself.

For information regarding the Irish *laidh* and its use I am much indebted to Dr E. Cecil Curwen. The practice in vogue among the ancient Chinese is often mentioned in their classical books ; for information concerning its modern survival I have to thank Dr. A. W. Hummel, of the Library of Congress, whose observations in the field confirm my own. The mode of using the Peruvian *taclla* is fully described in the paper by O. F. Cook cited above.

[5] W. M. Wundt, *Elements of Folk Psychology* (trans. by E. L. Schaub, undated), p. 291.

to have existed at one time or another in nearly every part of the north temperate zone of the Old World. Perhaps certain large leaf-shaped stone implements found in northern China were the shares of such primitive man-drawn ploughs.[6] Instruments operated on this principle were used until lately in parts of Europe ; and they still survive in

FIG. 1. MAP SHOWING APPROXIMATELY THE DISTRIBUTION OF THE TRACTION-PLOUGH PRIOR TO THE AGE OF DISCOVERY (ABOUT A.D. 1500)

The area indicated very closely coincides with that in which were found in antiquity many other important culture-elements, among them bronze, wheat and the horse drawn war-chariot

discontinuous and usually backward areas from North Africa and South Arabia right across to the extreme east of Asia.

The substitution of animal for human power marked the final step in the evolution of the true traction-plough. This change seems

[6] Père E. Licent, *Collections Néolithiques du Musée Hoang ho Pai ho*, 1932, I, 12.

most likely to have been initiated through the operation of ideas which we should consider the reverse of utilitarian, but which to earlier peoples seemed rational enough.

That the bull and the cow have often been regarded as embodiments and even as gods of fertility is well known. Such beliefs seem to have been more especially prevalent in those lands where wheat and barley were cultivated in antiquity. It was perhaps the wish to enlist the magical fertilizing force believed to inhere in the ox-kind rather than to secure the aid of their physical strength which led to their association with the operations of early agriculture. On Egyptian reliefs both bulls and cows are seen employed in traction, and they are still so used in many lands. The use of the ox could only have been a

FIG. 2. SUMERIAN PLOUGH, ABOUT 2400 B.C.
(*After* Ward, 'Seal Cylinders', p. 133, no. 374)

later development. Castration, of bulls as well as of men, probably originated as a feature of those orgiastic fertility cults so common in the ancient Near East; it symbolized a dedicatory sacrifice—a species of ritualistic synecdoche. Only after the practice had become established could men have learned that animals thus treated are thereby rendered more docile.[7]

The plough itself has often been regarded as a direct gift from the gods. The Egyptians ascribed its origin to Osiris, the great patron of agriculture, while the Vedic Indians believed that the Açvins had taught its use to mankind. In Greece its invention was variously imputed—to Zeus or Dionysos, to Pallas or Demeter. In China its origin came to be attributed both to Shên-nung, the 'Divine Husbandman', and to a (mythical) grandson of Hou Chi, 'Ruler of the Millet'.

[7] This question is well discussed by Wundt, *op. cit.*, pp. 290 *sq.*

PLATE I

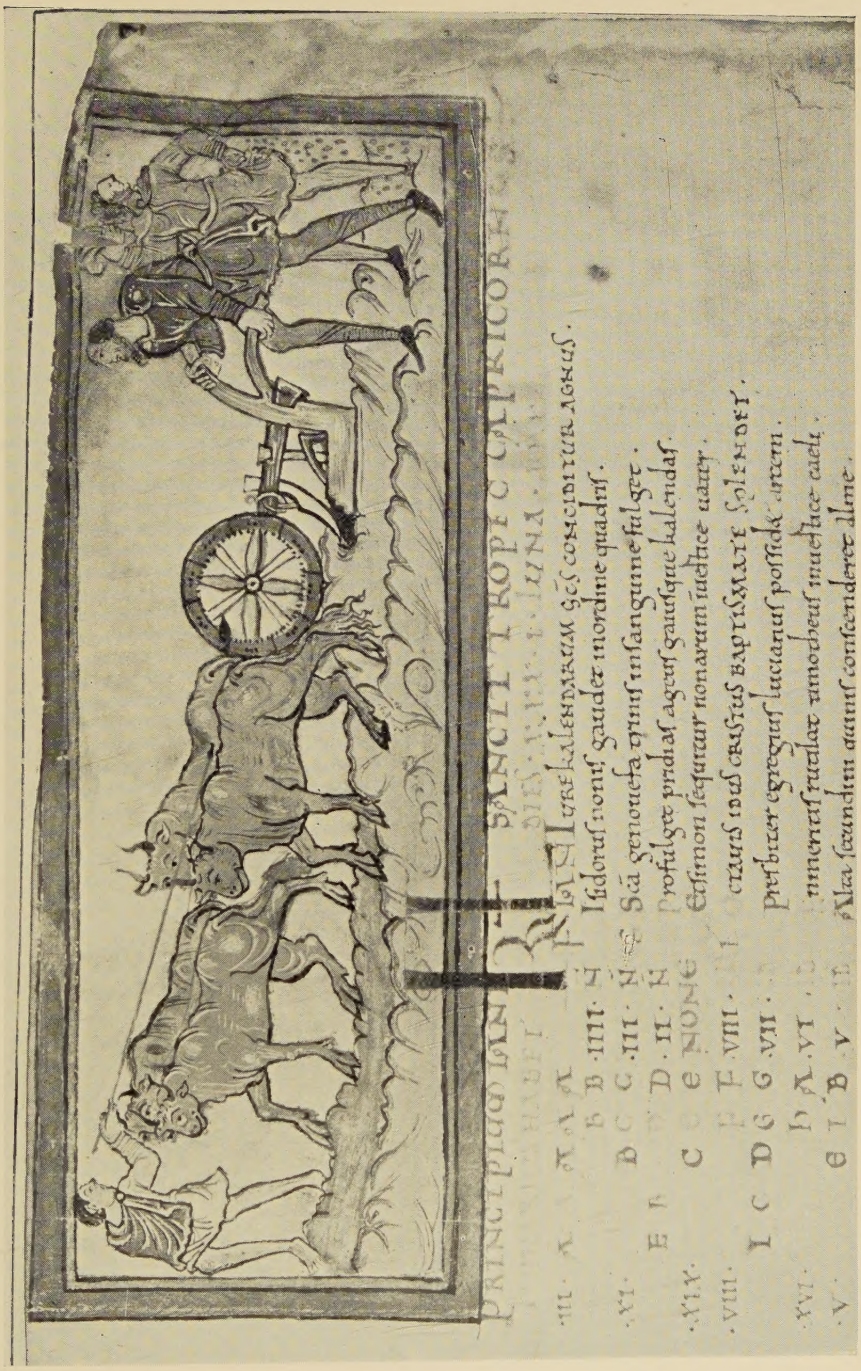

Fig. 8. FROM COTTONIAN MS. Tib. B. v (part 1), fol. 3. (11TH CENTURY).
Copyright, British Museum

facing p. 264

PLATE II

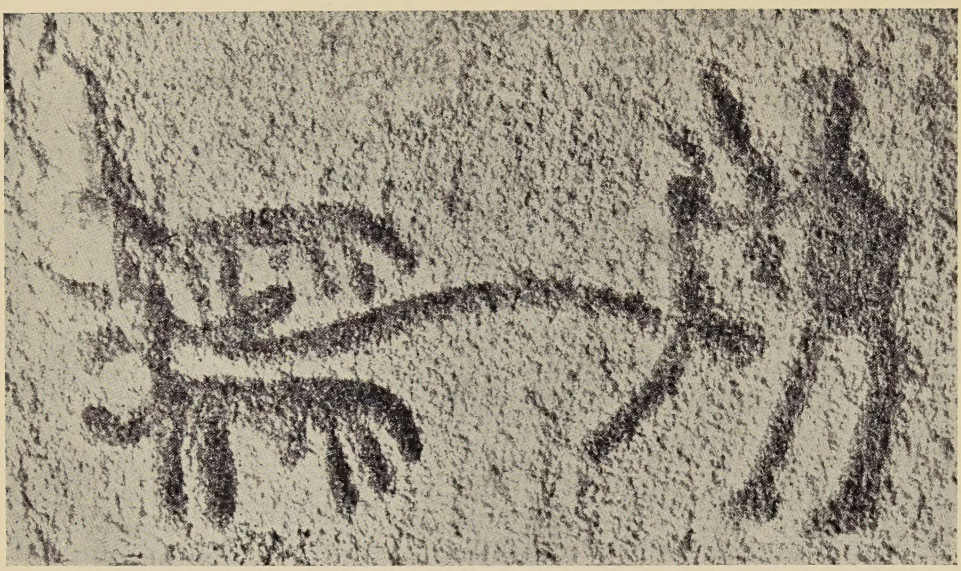

FIG. 9. SIMPLER OF THE TWO TYPES OF PLOUGHS SHOWN AT BOHUSLÄN
(*After* Sophus Müller)

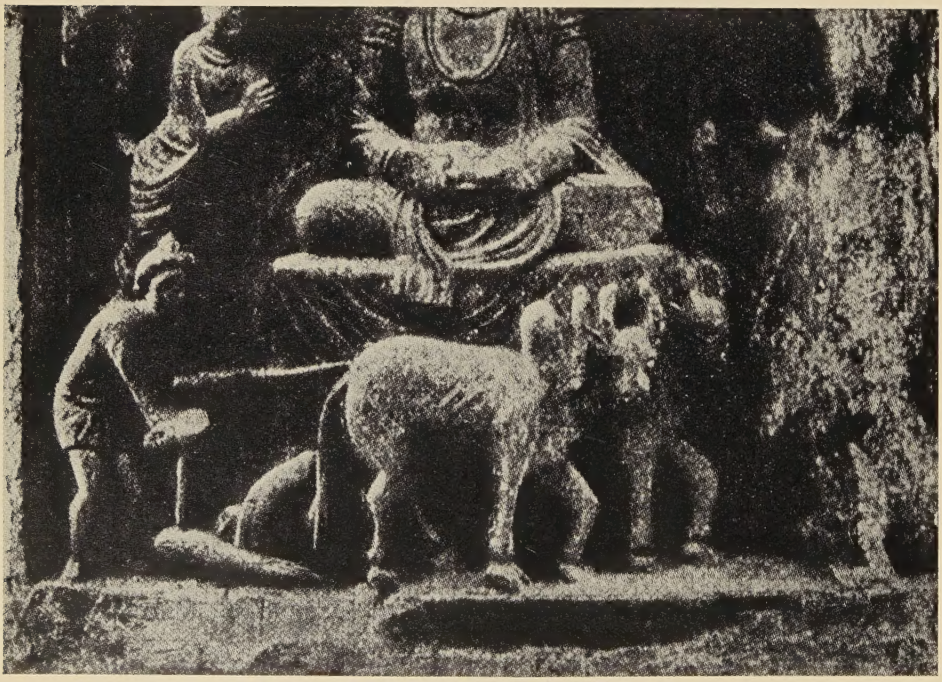

FIG. 10. INDIAN PLOUGH OF THE GANDHARA PERIOD
(*After* A. Foucher, L'Art gréco-bouddhique de Gandhara, I, 342, fig. 175)

PLATE III

FIG. 11. NORTHERN CHINESE PLOUGH WITH CURVED IRON BEAM AND SWINGLE-TREE
(*Copyright*, Messrs White Brothers, *by permission*)

FIG. 12. PLOUGH DRAWN BY A SINGLE ANIMAL, COMMON IN CENTRAL AND SOUTHERN CHINA AND IN SOUTHEASTERN ASIA GENERALLY

(*Copyright*, Messrs White Brothers, *by permission*)

This intimate connexion of the ox-drawn plough with religious ideology suggests the query whether it was not itself actually of priestly origin, and first employed in the production of sacred crops, destined for ceremonial uses. Examples of areas set aside for such a purpose are the Rharian (or Rarian) Plain near Eleusis, dedicated to Demeter, and the Sacred Field ceremonially tilled every spring by the Chinese emperors. Mesopotamian cylinder-seals display the ploughman garbed as a priest ; or they show the plough in association with astral symbols or being offered to a seated god or goddess of agriculture (FIGS. 2–3). Again, a Cypriote clay model of a ploughing scene from the Early Bronze Age, during the third millennium B.C., associates the plough

FIG. 3. ANCIENT MESOPOTAMIAN PLOUGHING SCENE
(*After* Ward, 'Seal Cylinders', p. 132, no. 372)

with those cults of the Divine Mother and the Sacred Bull once so widely diffused over the Near East.[8] In many lands, too, the initial ploughing of the year has been a solemn religious observance conducted in person by a priestly ruler ; such, for example, was the case in China until less than a generation ago.

The earliest method of attaching cattle to the plough seems to have been by means of ropes made fast to their horns—the latter themselves magical symbols of great potency ; both yoke and plough-beam appear to have been later developments. No doubt human and animal traction were employed in conjunction for a time. This

[8] *Illustr. London News*, Dec. 10, 1932, pp. 928 ff., and *Man*, Aug., 1933, no. 134. For early contacts of Cyprus with the mainland of Anatolia and Syria, see Sir Arthur J. Evans, *Scripta Minoa*, 1909, p. 68.

continued to be the case in ceremonial traction in Egypt down to late Dynastic times, and it is still the practice in certain backward regions.[9] Only through experience could men have discovered that, under proper guidance, oxen may be trained to draw the plough unaided.

We are as yet scarcely in a position to determine just when and where the traction-plough first appeared. That its evolution should have occurred independently in more than one area is improbable in the extreme ; for it involves the co-ordination of far too many culture-elements. Moreover all the available historical evidence is opposed to such a view. Once the idea of using animals for drawing the plough had been grasped, however, its secular advantages assumed increasingly greater preponderance over its religious aspects, and its wide diffusion became inevitable. In many lands, in place of being associated with the introduction of any given form of plough, animal traction seems often to have been adapted to already existing agricultural implements of either the foot-plough or the man-drawn type.

Recently it has been claimed that northern Europe—more specifically, the Nordic province—was the birthplace of the traction-plough. This claim we shall discuss later. Credit for its invention has also been proposed for the valleys both of the Nile and of the Euphrates. Possibly its evolution actually began in Upper Mesopotamia or North Syria during late prehistoric times, when those regions enjoyed a greater rainfall than they do today.[10] The abundance of remains of human habitation in many parts of the Near East which are now arid proves that at no very distant date, geologically speaking, that region possessed a far higher degree of humidity than now.

The first irrefragable proof of the use of the traction-plough anywhere is probably that found in an archaic Sumerian seal of about 3500 B.C., from the Royal Cemetery at Ur.[11] As the plough here shown is already as well developed in certain respects as its descendant of a thousand years later, we must postulate for it a long previous period of evolution. The actual beginnings of this process must go

[9] For a recent instance see Major J. Biddulph, *Tribes of the Hindoo Koosh*, 1880, p. 128.

[10] See Harold J. Peake and H. J. Fleure, *The Steppe and the Sown*, 1928, p. 7.

[11] For this citation I am indebted to Dr Leon Legrain, who tells me that the dating is still not quite certain. See *Ur Excavations* (Joint Exped. British Mus. and Univ. of Pennsylvania), II, ' The Royal Cemetery ', p. 336, no. 12, and plate 192, no. 12.

back at least as far as the fifth millennium B.C. or even before. The Uruk phase of prehistoric Babylonian civilization, commencing around 4000 B.C., perhaps as an intrusion from the northwest,[12] already employed animal traction for wheeled vehicles, and possibly in agriculture also, although this by no means necessarily follows. In ancient Egypt, for example, the ox-drawn plough long preceded wheeled vehicles, while in China the exact reverse was the case.

The early Mesopotamian plough is most often shown with two handles or stilts, and, save apparently in ritual ploughing,[13] the means of traction had progressed far beyond the primitive rope attached directly to the animals' horns. In some instances, even, we find depicted on the seals what seems to be a true neck-yoke, with bows or loops encircling the animals' throats.[14] There was no slade or sole, but merely a simple point. The plough-beam was of two pieces, joined together and sometimes displaying a double curve shaped like the sound-holes in a violin. Beams of this sort survive in the Near East to this day.[15]

The Babylonian plough seems to have undergone comparatively little change in form during the historical period. But by the latter half of the second millennium B.C., and perhaps much earlier, there was sometimes attached to it a ' seeder '—an upright tube open at both ends, through which an attendant dropped the seed-corn as the ploughing went on.[16] This apparatus appears also on Assyrian ploughs ; representations occur on the walls of Sargon's palace at Khorsabad[17] and on monuments of Sennacherib and Esarhaddon.[18] Somewhat similar features shown on seals are interpreted as representing a man pushing down the plough-point with a stick ; but perhaps in reality

[12] Dr E. A. Speiser, ' The Ethnic Background of the Early Civilizations of the Near East ', *Amer. Journ. Archaeol.*, 1933, p. 465.

[13] *Cf.* FIG. 5, representing a late Cassite ploughing scene, obviously ritual in character ; the difference in the position of the animals' heads emphasizes the absence of a yoke.

[14] W. B. Ward, *The Seal Cylinders of Western Asia*, 1910, p. 132, nos. 369, 371.

[15] For a modern instance see *Festschrift : publication d'hommage offerte au P. W. Schmidt*, 1928 : Paul Leser, ' Westöstliche Landwirtschaft ', p. 434, fig. 32.

[16] See FIG. 5, p. 270.

[17] Leser, *Entstehung*, p. 247 and note 53. Ploughshares were among the iron objects found in Sargon's palace. Some are now in the Louvre.

[18] For an example from a monument of Esarhaddon, *cf.* O. T. Pinches, *The Old Testament in the Light of the Historical Records of Assyria and Babylonia*, 1902, plate XIII, opp. p. 288.

what are intended are ' seeders '.[19] Little if any evidence exists for the very early use of metal shares in Mesopotamia ; and indeed it is unlikely that such were ever regularly employed anywhere before iron came into general use.[20]

That cattle were the only animals attached to the plough by the ancient Babylonians seems clear. It has been asserted that on one very early carving a man is shown ploughing with an antelope ; however nothing in the way of a plough is depicted here, and what we have is in reality a hunting scene.[21]

We are far better informed in regard to the ancient Egyptian plough, of which we have so many representations, from the IIIrd Dynasty onward.[22] It displays in general a more archaic aspect than the Mesopotamian plough ; but like the latter it usually has two handles, at first very short. In the earliest reliefs the Egyptian plough is often attached to the draught animals simply by a rope tied to their horns ; and even in later times, at any rate in ritual traction, a yoke is frequently absent (FIG. 4). When it does occur under the Old and Middle Kingdoms, it is of the most primitive description—merely a bar of wood lashed crosswise to the animals' horns. Although hornless cattle were known to the ancient Egyptians they seem never to have been used in ploughing.[23] Where in place of a rope a plough-beam is shown, it is usually short and always straight and displays none of the elaboration of Babylonian examples.

The use of a cross-tie of twisted and doubled thongs or cords, binding the beam to the lower part of the plough, near the point, arose quite early, but only became general towards the beginning of the XIIth Dynasty ; later still it was replaced by a cross-brace, apparently of wood. The Egyptians seem to have armed their ploughs with flint

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[19] Ward, *op. cit.*, pp. 132, 133.

[20] For plough irons at Gerar about the 12th century B.C. *cf.* ANTIQUITY, 1936 : G. A. Wainwright, ' The Coming of Iron ', p. 19.

[21] For the scene thus wrongly explained, see H. V. Hilprecht, *The Babylonian Expedition of the University of Pennsylvania*, 1893, vol. I, plate XVI, p. 88 ; also Ward, *op. cit.*, p. 30, no. 55. Dr Legrain has confirmed my own suspicions in regard to the true purport of this carving.

[22] On IIIrd Dynasty ploughs, see W. M. Flinders Petrie, *Medum*, 1892, ' Tomb of Nefermat '.

[23] Heinrich Schaefer, *Priestergräber . . . vom Totentempel des Ne-user-rê*, 1908, p. 17.

during most of the Dynastic Period ;[24] although there is some evidence that they were beginning to employ metal shares before its close.[25]

Save in minor details, the Egyptian plough underwent little evolution during Old and Middle Kingdom times. It was only after the Hyksos conquest—when, incidentally, wheeled vehicles first appeared in Egypt—that changes in the plough became more marked. It then grew progressively heavier and its stilts longer, while true neck-yokes, perhaps introduced from Asia, began to replace the archaic bars of wood tied athwart the animals' horns.[26] In some of the later Dynastic Egyptian ploughs there appears to be a tendency to develop a slade or

FIG. 4. LATE DYNASTIC EGYPTIAN RITUAL TRACTION ILLUSTRATING METHOD OF ATTACHMENT WITHOUT EITHER YOKE OR POLE
(*After* Wilkinson, *Ancient Egyptians*, 1878, III, pl. op. p. 449)

sole—a feature apparently already known in the Aegean area ; possibly its appearance in Egypt was connected in some way with those raids by the ' Sea Peoples ' then going on. Something which has very much the look of a coulter (not necessarily of metal) also appears in a few representations of ploughs on New Kingdom monuments, and at least one surviving example has actually been reported.[27]

[24] *Cf.* Fernande Hartmann, *L'Agriculture dans l'ancienne Égypte*, 1923, p. 79, fig. 10; also Jacques de Morgan, *Prehistoric Man*, 1924, p. 172. [25] See Schaefer, *op. cit.* p. 168.

[26] *Cf.* ANTIQUITY, 1934, IX, 456, referring to the Papyrus of Kumara. The ox-carts of the Asiatic foes of Rameses III have neck-yokes.

[27] *Cf.* M. C. Burkitt, *Our Early Ancestors*, 1926, p. 54, note 1. On the other hand, Dr. E. A. Speiser informs me that the mention of ' coulters ' in 1 Sam. XII, 20 and 21, is an anachronism due to a mistranslation.

Instances of the use of human instead of animal traction in ploughing are rare. An XVIIIth Dynasty relief (FIG. 6) shows a plough of the usual type drawn by four youths and guided by an older man who is closely followed by a sower.[28] The form of the plough here is wrongly reproduced by Lepsius[29] and by those who have copied him.

We know little as yet regarding the first appearance of the traction-plough in Asia Minor. As we have seen, the eastern portion of that area was perhaps not far removed from the original centre of diffusion. A high degree of civilization existed in the region west of the Taurus by the third millennium before our era[30], when the plough was already

FIG. 5. PLOUGHING SCENE ON LATE CASSITE SEAL-IMPRESSION
(*From* University of Pennsylvania *Museum Journal*, 1910, I, 4)

known in Egypt and Cyprus. That it was used in Asia Minor as early as it was in the latter of these two regions at least, we may regard as certain. The peninsula became indeed in the course of time a secondary area of diffusion. For more detailed information we shall have to await further archaeological research.

It was perhaps from Asia Minor that the traction-plough reached Crete. For the form used there during Minoan times, as it is depicted in the hieroglyphic script, shows no resemblance to those ordinarily used either in Mesopotamia or in Egypt. Unlike these, it has but a single

[28] J. J. Tylor and F. Ll. Griffith, *The Tomb of Paheri at El Kab* (Egypt Explor. Fund, 11th Mem., London, 1894), vol. I, p. 13 and plate III.

[29] Richard Lepsius, *Denkmäler aus Aegyptien und Aethiopien*, vol. III, plate 10–a.

[30] Sidney Smith, *History of Assyria to* 1000 *B.C.*, 1928, pp. 164 ff.

handle, with a transverse hand-grip, and a well developed slade in one piece with the beam. Both these characters the ancient Cretan plough shares with examples found in peat-bogs in northern Europe ; and it seems also to have been nearly related to the pre-classical Greek plough as well as to types found in the eastern Mediterranean area today.[31] It displays a distinctly more developed shape than do the ploughs shown in the Ligurian and Swedish petroglyphs which we shall discuss later.

FIG. 6. EGYPTIAN XVIIITH DYNASTY EXAMPLE OF HUMAN TRACTION IN PLOUGHING
(*From* Tylor and Griffith, *Paheri*, vol. I, pl. 3)

There appears to be no conclusive evidence for the use of the ox-drawn plough in Europe during the Neolithic period,[32] although some form of foot-plough was pretty surely known and perhaps human traction was also employed. However Mesopotamia was in contact from very early times with the steppe-lands north of the Mountain Zone,[33] and it was perhaps in this way that the idea of employing animal traction in agriculture reached that Black Earth region destined one

[31] For hieroglyphic representations of the ancient Cretan plough, *cf.* Evans, *Scripta Minoa*, pp. 190 ff, and fig. 102 (Table XIII), no. 27.

[32] V. Gordon Childe, *The Bronze Age*, 1930, p. 49 ; also Leser, *Entstehung*, p. 550.

[33] Childe, *The Aryans*, 1926, pp. 185 ff.

day to become the granary of Athens. From southern Russia—or perhaps from Asia Minor, though the latter seems on the whole the less likely source—the use of the plough spread to the Danube valley. It may possibly have appeared there during the latter half of the third millennium before our era ; for among remains of the culture known as Danubian II, which seems to have arisen about that time, there have been found large stone implements interpreted as ploughshares.[34] The latter may, it is true, have belonged to man-drawn implements ; but in any case it seems fairly certain that the Danube basin knew the true traction-plough by the beginning of the second millennium B.C.

It was perhaps both through the Balkans and either directly from Asia Minor or else through Crete that the use of the ox-drawn plough spread to Greece. For Hesiod speaks of two types as in use concurrently in his day.[35] Of these, one, very simple in construction, may possibly have been derived from Central Europe ; while the other, considerably more developed, points rather to contacts with the Aegean area or possibly with regions even farther to the east. Both forms have single handles and also slades, but apparently not metal shares. Our earliest knowledge of the ancient Greek plough we owe almost entirely to Homer and Hesiod and, a little later, to the vase-painters (FIG. 7).

In Italy there seems to have been little in the way of true agriculture during Neolithic times.[36] Not until the Bronze Age is the traction-plough found there. Perhaps it was introduced by the Terremare people—Dr Randall MacIver's ' Proto-Italici '—invaders from the northeast who appeared in Upper Italy somewhere around 1700 B.C., bringing with them a highly developed agriculture.[37] Our earliest concrete evidence for the plough in the peninsula is probably that found in certain rock-drawings in the Ligurian Alps.[38] These are generally believed to date from the second millennium before our era—during the period, that is to say, when the influence of the Terremaricoli was making itself felt in northern Italy. It seems unlikely that these petroglyphs can have been the handiwork of the native

[34] Regarding the intrusive elements, apparently deriving from southern Russia, which appear in Danubian II, *cf.* Childe, *Dawn of European Civilization*, 1925, p. 177; on p. 179 of the same work, Danubian II is dated *c.* 2500–2200 B.C.

[35] *Works and Days*, pp. 427–436.

[36] Randall MacIver, *Italy before the Romans*, 1928, p. 41.

[37] Randall MacIver, *op. cit.*, pp. 35, 36.

[38] For an account of these see M. C. Burkitt, ' Rock Carvings in the Italian Alps ', ANTIQUITY, 1929, III, 155–164.

Ligures, whom Posidonius describes in the first century B.C. as ' wild huntsmen, almost ignorant of agriculture '.

The plough shown here was composed of two pieces, a combined handle and point and a beam. So far as our evidence goes, this was the only form in use in Italy for several centuries.[39] It was apparently not until the earlier half of the first millennium B.C. that there was introduced an improved form, having a slade, and comparable in other respects also to the more developed type mentioned by Hesiod.[40] Its arrival in the peninsula was pretty surely connected with the movements which led to the settlement of the Etruscans northwest of the Tiber and of the Greeks in Magna Graecia.

FIG. 7. ANCIENT GREEK PLOUGH
(From a vase-painting by Nikosthenes)

During the Roman period agricultural implements of all kinds underwent a marked development. Among the new devices then adopted seem to have been mould-boards, a wheeled forecarriage, and definitely the coulter.[41] These improvements were perhaps the work not alone of the peoples of Italy but also of some of those dwelling beyond the Alps. In any case, they were diffused over a large part of western and central Europe, where their evidences are visible throughout the Middle Ages and even down to our own times (*cf.* FIG. 8).

[39] This form seems to have been the forerunner of the Roman *aratrum simplex*, comparable to Hesiod's *αὐτόγυον ἄροτρον*. [40] The *πηκτὸν ἄροτρον*.

[41] See G. W. B. Huntingford, ' Ancient Agriculture ', ANTIQUITY, 1932, VI, 328.

That the peoples of the Iberian Peninsula had the traction-plough before the Roman occupation is certain ; but as to the date of its first appearance there we are quite in the dark. It may have been introduced there during the Celtic invasions,[42] or, even earlier, from northern Italy, between which and Spain we know that there were contacts. The Celtiberians had a two-piece plough without a slade and in general resembling that shown in the Ligurian petroglyphs ;[43] while some of the more archaic Spanish and Portuguese ploughs used down to recent times recall forms found in central and even eastern Europe. The Greeks and Carthaginians can of course scarcely have failed to bring with them improved eastern Mediterranean types.

Regarding the presence of the plough in North Africa (west of Egypt) before the former half of the first millennium B.C., our knowledge is slight. In early historical times the Libyans seem on the whole to have been pastoral ;[44] yet they grew cereals in the time of Merneptah, late in the 13th century B.C.[45] Among the modern Berbers there has been noted an agricultural complex, apparently of great age, including along with many magical practices the use of the ox-drawn plough, regarded as sacred.[46] Agriculture in North Africa must have received a great stimulus from the planting of the Phoenician and Greek colonies along the littoral. The Carthaginians in particular developed it to a very high pitch, as we are told by more than one ancient writer ; Columella, for example, in the first century A.D., even calls Mago ' the father of husbandry.[47]

It was most probably during the Late Bronze Age that the ox-drawn plough reached western Europe—say somewhere around the beginning of the first millennium B.C. During the same period or very early in the Iron Age it seems to have appeared in Britain ;[48] although some have doubted its arrival there before the Roman conquest in the

[42] For a brief discussion of these as they relate to Spain, see Georg Kraft, ' The Origin of the Kelts ', ANTIQUITY, 1929, III, 33 *passim*.

[43] For a representation of a Celtiberian plough on a coin, see Daremberg-Saglio, *Dict. des Antiq.*, I, 354, fig. 434.

[44] *Cambr. Anc. Hist.*, I, 36.

[45] Oric Bates, *Eastern Libyans*, 1914, p. 98.

[46] C. S. Coons, *Tribes of the Rif* (Harvard African Studies, vol. IX, 1931), pp. 49 ff.

[47] *De re rustica*, I, i, 13.

[48] E. Cecil Curwen, ' Prehistoric Agriculture in Britain ', ANTIQUITY, 1927, I, 287.

first century A.D.[49] That the earliest British plough resembled those shown in the Ligurian petroglyphs seems likely, while its ultimate derivation from the Danube basin hardly admits of a doubt. After the Saxon conquest the older and lighter Celtic plough was in a measure displaced by a heavier one, drawn by as many as four yoke of oxen—a type perhaps devised in South Germany during the early centuries of our era.[50]

The same form of plough as that first found in northern Italy and in all likelihood in western Europe also reached the Baltic area. An article has recently appeared undertaking to prove, through a resort to pollen analysis, that a traction-plough found in a peat-bog at Walle, in East Friesland, belongs to Neolithic times—according to this author, as long ago as 3500 B.C.[51] This would carry us back as far as the first recorded appearance of the plough in ancient Sumer, and something like a round millennium before the earliest probable date of its arrival in Central Europe. The writer of the above paper further points out that the Walle plough is similar to those shown on the Certosa situla and on certain Greek vases—the implication of course being that the type persisted practically unchanged for some three thousand years, during which it diffused itself slowly southward from the Baltic to the Mediterranean.

Any such dating as that claimed for the Walle plough is, on *a priori* grounds alone, most improbable—unless we are prepared to admit for the prehistoric Germans a wholly independent focus of culture development of their own, somewhere in the Baltic area. Moreover, valuable as is pollen analysis for some purposes, any effort to establish by that method alone the age of intrusive objects (particularly heavy ones) found in peat-bogs is, to say the least, extremely hazardous. Finally, the Walle plough seems crudely constructed rather than truly primitive in form—which is by no means the same thing. We shall need much more convincing evidence than any as yet adduced before we can accept the north of Europe, whether in the fourth millennium B.C. or at any other time, as the birthplace of the traction-plough.

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[49] Harold J. Peake, *Early Steps in Human Progress*, p. 122.

[50] *Cf.* Curwen, *l.c.*, ANTIQUITY, 1927, I, 280 ff.

[51] *Natur und Volk*, vol. LXIV, 1934: Dr. Jacob-Friesen, 'Die älteste Pflug der Welt', pp. 83–91. See also *Upplands Fornminnesförenings Tidskrift*, vol. XLV, no. 1, pp. 1–19, Ragner Jirlow, 'Plogkroken från Svarvarbo och några förhistoriske plogar' (with summary in German). For calling my attention to the latter paper, I am indebted to the Editor.

That the latter was known, however, in the Baltic area during the Bronze Age or at latest early in that of Iron is certain. Depicted in the well known rock-drawings of Bohuslän, in southern Sweden, are ploughs of two types. One (FIG. 9), of two pieces only, is closely similar to the form shown in the Ligurian petroglyphs. The other is like it save for the addition of a third member in the shape of a cross-brace identical in function to that found in the later Dynastic Egyptian ploughs.

One writer calls these Swedish petroglyphs ' incontestably of the Early Bronze Age '.[52] Others regard them as belonging to the Middle Bronze Age. Sophus Müller says merely that they are ' centuries later ' than their Ligurian analogues.[53] The same scholar, while discussing a plough found in a bog at Døstrop, in Jutland,[54] strikingly like the simpler of the two types seen at Bohuslän, states that it is either of the Late Bronze Age or early in that of Iron.[55] In any case it seems clear that the ox-drawn plough was known in Sweden by the middle of the first millennium B.C. or possibly a few centuries earlier.

The Swedish ' plough-crook ', long drawn by hand and only in comparatively recent times by mares or cows, closely resembled the two-piece plough at Bohuslän. Like the latter, it consisted of only two members—a combined handle and point and a beam or pole.[56] In Sweden as elsewhere, what seems to have been the earlier method of traction, by human power, long survived side by side with that which depended upon the use of animals.

The unmistakable resemblance between the ploughs shown in the Ligurian and in the Swedish petroglyphs is best explained on the assumption of derivation from a common source—almost certainly the valley of the Danube.

Whether the Indus civilization had the ox-drawn plough is as yet uncertain.[57] Northwestern India was however in active commercial communication with Babylonia at a time when the latter had already

[52] *Natur und Volk*, Jacob-Friesen, *l.c.*, p. 84.

[53] Sophus Müller, *Urgeschichte Europas*, p. 147.

[54] The Døstrop plough is shown in *Méms. Soc. Royale des Antiquaires du Nord*, 1902, p. 21, fig. 1, in connexion with the article by Sophus Müller cited in footnote 2.

[55] The Scandinavian Iron Age appears to have begun not very far from 600 B.C.

[56] R. U. Sayce, *Primitive Arts and Crafts*, 1933, p. 115.

[57] Sir John Marshall, *Mohenjo-Daro and the Indus Civilization*, 1931, I, 27 ; II, 456 and note 1.

long known the plough ; hence its contemporary use in the valley of the Indus seems at least possible. At all events it was common there in Vedic times ;[58] and it appears to have spread over much if not all of northern India before the middle of the first millennium B.C.

The ancient Indian plough (FIG. 10) reached Burma and southern India in time, and it was carried during the earlier centuries of our era to portions of the Indo-Chinese peninsula and to certain of the East Indian islands, notably to Java. The form still used in Bali, with its straight beam and its lack even of a cross-brace, wears an especially archaic look ; while the Siamese rice-plough betrays strong Indian affinities.

In Central Asia not enough archaeological work has been done as yet to provide us with any clue as to the date of the first appearance of the traction-plough in that region. Forms found there today, however, resemble those used in the Near East—a fact which betokens contacts of some sort. These have of course been constant since the period of Muhammadan expansion north and northeast of the Mountain Zone. That they were going on far earlier is no less certain.

Common wheat (*Triticum vulgare*) and barley (*Hordeum distichum*), regarded by most authorities as of southern or southwestern Asiatic origin, have been reported from a site in Russian Turkestan probably of the third millennium B.C.[59] The undivided Indo-Iranians, perhaps once seated in the same general region, knew some form of plough.[60] Coming down to Assyrian times, the representation of a two-humped or ' Bactrian ' camel on the Black Obelisk of Shalmaneser (9th century B.C.) pretty clearly indicates the existence of relations of some sort with the lands north of the Zagros and the Hindu Kush. The *Arimaspeia* of Aristeas of Proconnesos betrays an intimate knowledge of Central Asia.[61] During the latter half of the sixth century B.C., both Cyrus and Darius pushed their conquests far to the northeast. Quite recently there have been found in Chinese Turkestan Greek coins of the third century

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[58] *Cambr. Hist. India*, I, 99. For additional information on this matter I am indebted to Dr. Franklin Edgerton, of Yale University.

[59] Raphael Pumpelly, *Explorations in Turkestan*, 1908, II, 472.

Dr. Hubert Schmidt's dating (*id.*, I, 486) of the earlier settlements at Anau as being of the third millennium B.C. appears to have received general acceptance.

[60] Peake and Fleure, *The Horse and the Sword*, 1933, p. 138. That the Indo-Europeans as a whole had the plough prior to their dispersion seems less certain.

[61] For a discussion of this question see G. F. Hudson, *Europe and China*, 1931.

B.C., from the kingdom of the Bosphorus.[62] Thus all in all it seems evident that so far as opportunities went, the traction-plough might have reached Central Asiatic regions at almost any time during the first two millennia and more before our era.

This possibility is further strengthened by the fact that the varieties of wheat grown in Central Asia and even in China are identical with those of the Near East.[63] Wheat (*T. vulgare* and perhaps also *T. compactum*) had reached China by the middle of the second millennium B.C., as is shown by nearly contemporary inscriptions. The same seems also to have been true of barley (probably *H. distichum*). These cereals were not, however, accompanied by the traction-plough, although the Chinese of that day employed both horses and bullocks to draw wheeled vehicles. The usual agricultural implements used by the peasantry of the Chinese Bronze Age[64] were various forms of the foot-plough, used by men working in pairs. So typical was this practice, indeed, that the ideograph meaning ' a pair ' (of any sort) was formed of two *lei*—implements of the foot-plough class—depicted side by side. Further, the pictograph representing a single *lei* became the determinative or ' signific ' of a large class of characters having to do with agriculture. It seems likely, in the light both of numerous existing survivals and of certain statements in the ancient Chinese texts, that human traction also was once widely employed in Eastern Asia.

There is no mention of the ox-drawn plough in China during the earlier historical period. This might be taken merely for negative evidence were it not that we find the definite statement that it was introduced ' about the middle of the Epoch of the Warring States ' (403–255 B.C.)—that is to say, sometime in the latter half of the fourth century before our era.[65]

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[62] Dr. Erich Diehl, ' Bosporanische Münzen aus der Dschungarei ', *Blätter für Münzfreunde*, 1923, pp. 441–9.

[63] *Zeitschr. für induktive Abstammungs- und Vererbungslehre*, Suppl. 1, Leipzig, 1928 : N. I. Vavilov, ' Geographische Genzentren unserer Kulturpflanzen ', p. 352 and map on p. 353.

For a discussion of Vavilov's views, see A. E. Watkins, ' The Origin of Cultivated Plants ', ANTIQUITY, 1933, VII, 73–80.

[64] The Chinese Bronze Age lasted from the former half of the second millennium until the latter part of the first before our era.

[65] For this citation I am indebted to Dr. A. W. Hummel.

This dating is significant. For it was precisely then that the feudal state of Ch'in[66]—corresponding roughly to the present northwestern province of Shensi—annexed the eastern termini of both the two great land-routes linking China with the Occident.[67] Of these, one was of course that traversing Central Asia ; while the other connected western China, by way of Burma, with the valley of the Ganges. Now Ch'in was noted not only for her devotion to war but also for her encouragement of agriculture and her receptivity toward new ideas. She, more than any other Chinese state of that day, would have been likely to welcome and adopt the traction-plough.

By which of the two routes just mentioned knowledge of the plough made its way to China, we cannot say. Possibly it may have spread to the basin of the Huang Ho (the Yellow River) through Central Asia ; and to that of the Yangtze from Farther India, along the same path as that taken in prehistoric times by rice, the domestic fowl, and other culture-elements.[68] In any case, once it had appeared, it seems to have spread within a century or two over most of northern and central China Proper.

It is noteworthy that when the need arose for a written symbol to denote the new implement, the determinative chosen was not that in regular use with ideographs having to do with agriculture (see p. 278) but the character for ' ox ' ; as though in the minds of the Chinese scribes the significant thing about the plough was not so much its use in tillage as its association with animal traction.

The Far Eastern plough of today is frequently (although by no means invariably) drawn by one or sometimes two animals harnessed with rope traces to a swingletree pivoting on the end of a short and usually much curved plough-beam (FIGS. 11, 12). Whether this method of attachment is really ancient in China is uncertain ; but we know from the evidence of old paintings that it was in use at least as far back as the 12th century A.D.[69]

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[66] Ch'in was the state destined about a century later to establish the first centralized and bureaucratic Chinese empire ; from its name comes ours of ' China '.

[67] The sea-route to the Far East only came into use around or perhaps very shortly before our era, when Western ships began to appear in southern Chinese waters.

[68] The importance of this ' back-door ' to China has never received the recognition which it deserves ; yet through it have come many important elements of the Chinese civilization, from prehistoric times down to the present day.

[69] Dr. A. W. Hummel has very kindly brought to my attention Chinese paintings of that period in the Library of Congress which illustrate the point involved.

North of China, in Mongolia, the sedentary 'peasant' type of culture which occupied that area during Neolithic times had given place, apparently by the middle of the first millennium B.C., to a pastoral nomadism not unlike that found there today. In this, the plough could naturally play little part. In other directions—east, west, and south—the spread of the traction-plough from China as a secondary centre of diffusion went on apace. Here the Chinese accounts are of particular value for the light that they throw upon the workings of a process which in the lands of the Occident had gone on largely unrecorded.

Thus it was from China that the plough reached eastern Tibet—according to a late source, in the early centuries of the Christian Era; in the central and western portions of that country, as we might expect, Indian contacts are more apparent.

From the Yangtze valley the plough travelled to what are now southern China and French Indo-China, perhaps just before the commencement of our era. From northern China, around the same period, the plough reached southern Manchuria and Korea. Either from the latter country or directly from China it was carried, about the fifth or sixth century A.D., to the Japanese islands. But there it never acquired first-rate importance, the peasantry placing dependence rather upon hoes, mattocks, and implements of the foot-plough and man-drawn classes.

From China, again, the traction-plough travelled to the East Indian archipelago, occupation of which it shared with the type from India. Generally speaking, the line of demarcation between the two fields of cultural influence extends, though with many interpenetrations, from east-central Tibet southward through the Indo-Chinese peninsula, thence swinging off in a southeasterly direction into Indonesia. Formosa, the Philippines, and North Borneo remain on the Chinese side, while Sumatra, Java, and their nearer neighbours fall within the Indian sphere. It seems to have been only in this quarter of the globe that the traction-plough in its earlier career penetrated, albeit very slightly, south of the equator.

Let us now summarize briefly the results of our inquiry. These seem to make it fairly clear that the traction-plough appears at progressively later dates the farther we travel, in whatever direction, from the region where we find the earliest indications of its use—that is to say, in the ancient Near East. Moreover its extension, so far as we have been able to trace it through written records, has invariably

been due to diffusion—to culture-borrowing, never to repeated independent invention. There is every reason to believe that the same holds true for prehistoric times also. These facts go a long way toward accounting for that essential unity underlying the agricultural systems upon which have been based the great civilizations of the Old World.[70]

[70] On this unity see Leser, *Entstehung*, p. 545; also his paper in *Festschrift Schmidt* cited in footnote 15.

Mapungubwe

First Report on Excavations in the Northern Transvaal

by C. van Riet Lowe

Director, Bureau of Archaeology, University of South Africa

So many local and overseas enquiries have been received that the Archaeological Committee of the University of Pretoria feels that a preliminary account of the excavations being conducted at Mapungubwe is desirable. I have accordingly been authorized to publish the following statement.

Toward the end of 1932 the attention of Professor Leo Fouché—then Professor of History at the University of Pretoria and now at the University of the Witwatersrand—was drawn to the discovery of finely wrought gold ornaments and imported glass beads from an ancient deposit on a farm in the Zoutpansberg District of the Northern Transvaal, Union of South Africa. Recognizing the archaeological potentialities of the site, Professor Fouché immediately set machinery in motion to secure it from damage by treasure-seekers and vandals. With a view to protection and thorough archaeological investigation, and inspired by Professor Fouché's enthusiasm, the Government of the Union of South Africa very magnanimously supported an appeal from the University of Pretoria by acquiring the farm and giving the University generous financial assistance for investigations. Considerable help was also given by the Municipality of Pretoria and by certain private donors, and finally arrangements were made for the University to have the exclusive right to investigate over a period of five years; the control of field-work to be in the hands of the Committee.

Since the discovery was first announced, the site has been systematically investigated by archaeologists and ethnologists, and valuable data secured. The most spectacular finds include hoards of gold beads and ornaments, masses of coloured glass beads from the Near and (?) Middle East, Chinese porcelain, ivory, copper, bronze, iron, and a great mass of pottery, and human, faunal and vegetable remains.

The beads show close affinities with those recovered from Zimbabwe and other ruins in Rhodesia, and it is impossible to escape

the conclusion that there flourished in the Northern Transvaal a material culture that was influenced by factors that left their mark over a wide area in Rhodesia in medieval days. As the investigations are still in progress, it is obviously impossible to draw final conclusions, but it is hoped that the reports of the various investigators and experts who were consulted (South African and European), will shortly appear in book form. When published, this work will no doubt very materially increase our knowledge of the medieval history of South Africa. It is hoped that the first volume, dealing exclusively with the work of the first two seasons, will soon be in the printer's hands.

The scene of the original discovery and the site on which work has been concentrated is on the summit of an almost impregnable hill, an acropolis-like natural fortress known as Mapungubwe, on Greefswald farm near the junction of the Shashi and Limpopo rivers (29°20′ E, 22°30′ S). The farm is about 160 miles southwest of Zimbabwe and just over 50 miles due west of Messina, where there are extensive remains of pre-European copper-mining.

Mapungubwe itself is one of several spectacular sand-stone formations that rise independently and almost perpendicularly for 200 and more feet from a valley that feeds the Limpopo from the south. It is fish-like in plan, about 300 yards long and 60 or so in width across the minor axis. From whatever direction one approaches from the valley, one mounts a steep gradient until reaching the foot of a cliff that rises sheer for about 100 feet. But for a single natural and narrow chasm, known as the 'Western Ascent', this cliff is inaccessible—except where artificial aids are employed. The ancients who lived on the summit improved this chasm or 'chimney' by cutting notches and holes in the opposing walls of rock apparently as rests for the ends of rungs, and presumably reached the top by climbing an improvised ladder. In somewhat similar fashion they also prepared other ascents, notably the Eastern Ascent, and the Southern or Mahobi Ascent, only in these the notches were 'grips', not rung-rests.

Remains of dry-stone walling in the form of breast works are to be seen at the top of every ascent, and as no ascents could be mounted except in Indian-file, the protection of the top against attack or unlawful entry was a simple and effective undertaking.

Originally the top was rugged and irregular, but the irregularities were overcome by an artificial infilling of earth laboriously carried up from the valley below. Where necessary, dry-stone retaining walls were built round the sides (every stone having to be carried to the top),

until, with the passage of time, practically the entire summit was roughly levelled and terraced to provide foundations and floors for huts, granaries, etc.

In time more and more material (much of which is pure midden) accumulated, until the amount thus laboriously transported to the top must have amounted to about 30,000 tons as, at a very conservative estimate, about 25,000 tons still remain. This accumulation of material on the summit was obviously not the work of one generation, but many successive generations. The loss of material from the top is traceable to extensive taluses and other deposits round the foot of the cliff, where debris was tipped or fell as a result of a collapsed retaining wall. The ancients lacked both the material and the skill to erect effective retaining walls where these were surcharged, as was obviously the case at Mapungubwe.

The deposits round the foot of the cliff contain all the elements found on the summit (gold, glass, beads, ivory and bone awls, masses of potsherds, iron and copper weapons and ornaments, animal bones, etc.), thus establishing beyond doubt that the accumulations along the base of the cliff are due not merely to tipping, but also to erosion from the top after the collapse of retaining walls. It is extremely improbable that the ancients threw gold and glass beads over the edge, and as these are found in the taluses, it is obvious that the material was derived from the top by such a natural process, probably after the place was deserted.

After a preliminary and hurried visit by Professor Leo Fouché and a few companions immediately after the discovery, the first expedition went up in April 1933 to determine, if possible, if work on an extensive scale was warranted. It was led by Professor Fouché and included Professors D. E. Malan (anatomist and zoologist), Felix Tromp (chemist), van Riet Lowe (archaeologist and surveyor) and Mr D. Malan (commissariat).

Trenches and trial-pits were sunk at various points and in every instance the deposit was found to be an artificial accumulation from top to bottom—an accumulation of hearths, potsherds, bones, artificially consolidated (' cement ') floors and platforms, in-fills of earth, stones and so on. Hut floors, retaining walls, and granary foundations were clearly traceable, and in various trial-holes throughout the deposit gold, copper, iron, imported glass beads, ivory and bone ornaments and tools were uncovered ; hearths and floors were encountered, and masses of bones and potsherds. After a fortnight's exploratory work and the completion of a detailed tacheometrical survey of the summit,

the expedition returned and recommended exhaustive exploitation by archaeologists, and also by ethnologists.

Funds had naturally to be raised and by means of generous State and private support, sufficient money was collected to equip and send up the necessary experts. Meanwhile an Archaeological Committee of the University of Pretoria was constituted to control expenditure, and procedure, and generally to be responsible both to the State and the Council of the University. The Committee included members drawn from the University and the public, with four nominees of the Department of the Interior.

The Archaeological Committee invited the well-known archaeologist Mr Neville Jones, to take charge of the 1934 expedition. Most ably assisted by Mr J. S. Schofield, who volunteered to assist Mr Jones, and Mr J. W. van Tonder, work was started in June 1934, and completion of the task was reported to the Committee in September 1934.

It is obviously impossible to anticipate the reports of these gentlemen at this stage, and all that need be said is that after having systematically excavated and examined over 1500 tons of material, their findings indicate complete homogeneity of culture from the beginning to the end of the period of occupation.

Meanwhile Professor G. P. Lestrade investigated the ethnological field. He collaborated most closely with Mr Neville Jones and collected information over an extensive area. His conclusions may briefly be summarized as follows: Mapungubwe was occupied by a Bantu-speaking people of mixed elements of Shona and Sotho origin; the former having come from the north—*i.e.* by Rhodesia, while the latter came from the west by Bechuanaland. These conclusions are borne out and strengthened by the findings of the other investigators, based on technological evidence.

When Messrs. Jones and Schofield left the site in the spring of 1934, Mr van Tonder was permitted by the Archaeological Committee to continue the work. He actually worked through the malarial season (summer) of 1934–35, and reaped a spectacular reward. His first discovery was a burial that contained about 70 ounces of finely wrought gold ornaments and a mass of imported beads. This rich find, which added materially to the knowledge previously gained, led to the discovery of a cemetery containing no less than 23 burials and further considerable quantities of gold, glass, ivory, copper, iron and bone ornaments and weapons (unfortunately much corroded) and several very beautiful earthenware bowls of a funerary type.

The cemetery or ' Grave Area ' as it is called, lies within a well defined area on the lower western slope immediately adjacent to the original discovery.

In almost every instance the body was interred in a flexed position on its side with no regard for orientation. Finely made and beautifully ornamented dish-like bowls were placed with the dead. The women were found with masses of metal anklets and bangles made of wire, principally iron, wound round fibre or sinew. Glass beads were occasionally used to ornament the bangles. In two instances the bodies were interred with considerable masses of gold and imported glass beads of various sizes and colours—white, black, blue, green, yellow, orange, red—and finely wrought and moulded gold-foil or plating used as coverings for a bowl, sculptures, etc. The plating was secured to the sculpture (? wood) by means of pure gold tacks that were driven and beaten into the plate before the whole was ornamented with simple geometrical figures of chevron, herring-bone and triangle forms similar to those used for decorating the pottery. The tacking of the plates was identical with that employed by the silversmiths of Dahomey.

Where the body was not flexed and lying on its side, usually right, the mode of burial seems to have been in a sitting or squatting posture. In one grave it was almost certainly buried in this position in a cavity, for when uncovered it was found to be complete but to have collapsed or pancaked. The skull was found on the pelvis with all the long bones alongside, the whole interspersed with masses of gold and glass beads. It was clearly not a case of dismemberment, but of collapse. It was from this particular grave that the gold content ornaments were taken, most of them being wire bangles. Tacks and gold-plating in scroll and boss form and a golden ferrule and a gold-plated handle suggest the existence of a staff-of-office that reflects the importance of the person buried.

Burials were also found where children had been interred in graves encircled by pots of various sizes and shapes.

As these burials belong to the culture represented by the various industries of the site, they are most important. Unfortunately the great mass of skeletal material uncovered was excessively friable and most of the skeletons crumbled to the touch, but fortunately sufficient material was recovered to enable a complete reconstruction to be made.

As a result of his preliminary examination of the faunal remains, Professor D. E. Malan has recognized the important fact that about 95 per cent. of the bones belong to domestic animals : cattle, sheep and

probably goats. I say important because it is immediately established that the bearers of the Mapungubwe Culture were a pastoral people. They were also agriculturalists, for among the vegetable remains we have kaffir corn (millet), ground nuts, beans and a variety of melon, etc.

The pottery is extremely interesting and will be fully described by Mr Schofield in a special monograph. It need only be pointed out here that the mass of most typical pottery is reminiscent of certain forms that occur in the later occupation-layers at Zimbabwe, *i.e.* the period of occupation when all the foreign elements were introduced and gold was plentiful.

In June 1935, the Committee was fortunate in getting the help of Captain Guy Gardner, who had previously gained experience in archaeological research when he worked for some six months with Miss Caton-Thompson and his sister, Miss Elinor Gardner, in the Fayum. He was put in charge of the expedition, and with the continued assistance of Mr van Tonder he remained at Mapungubwe until the end of September 1935, when owing to the approach of the malarial season and largely influenced by an embarrassingly slender account, the Committee decided to close down for the season.

While Captain Gardner continued excavations in the main deposits on the summit of Mapungubwe, he also directed his attention to an adjacent site known as Bambandianalo—a site that was slightly explored by Messrs. Schofield and Neville Jones, who reported that the superficial remains found there belonged to the Mapungubwe Culture.

Several very interesting discoveries were made. In the first place a hut-floor littered with ivory chippings and objects was uncovered (at depth)—obviously the 'seat' of a craftsman. Two whole ivory bangles and several awl-like points were also found. The next interesting discovery was an old-hut-floor with a stone platform, masses of potsherds, a whirler and 148 polishing stones—the seat of a potter or potters.

The exploration of Bambandianalo—which is far from complete—has led Captain Gardner to certain striking conclusions. He inclines to the belief that the earliest occupants of the site (apparently Sotho) represent the very vanguard of the invasion of the present Union of South Africa by Bantu-speaking people—people who worked in copper and bronze in preference to iron. Where quantities of copper have been found in the lowest strata, little evidence of iron exists. The pottery is also different. While it reveals a marked diversity of form, it also shows an evolutionary process from rough undecorated ware to a highly

refined and decorated technique. Among the latter are several types brought to light which seem to point to their having been fashioned to take a special lid, while another is exactly like a two-compartment vegetable-dish type. Both are well glazed and fired, but devoid of decorations. Another interesting feature of the pottery is the large number of spouted pots, and pots with lugs, both perforated and plain. Some of the rims have decorations on the upper edge, which is rather unusual.

Captain Gardner is convinced that the people who first settled at Bambandianalo were in no way connected with the gold-workers of Mapungubwe. He thinks that the culture at the former site is much older than that of the original Mapungubwe gold-workers, although it is not unlikely that the two groups of people lived side by side at a later date, and finally probably merged into one.

The main excavations at Bambandianalo are being conducted in a great midden containing about 40,000 tons of material that reached a maximum depth of 20 feet. It is composed of pure ash and dust with vast quantities of animal bones and sweepings from huts. Many centuries must have been required for this vast accumulation—the lower strata of which are now well consolidated.

Here the burials are also different from those uncovered on the summit of Mapungubwe. Several skeletons were found in a surround of small stones, the whole covered with potsherds, usually inverted. Animal bones were occasionally mixed with human, an occurrence which can only be explained by a cult. The bones of an animal (? cow) that had been buried ceremonially were also found : portions of a jaw, a femur and some ribs carefully covered with inverted potsherds and surrounded by small stones as in the case of the human burials.

The beads found, cylindrical ' garden-roller ' types in dark green and dark purplish blue, are described by Mr Horace Beck as extremely ancient.

Masses of burnt millet and hundreds of grinders of the pestle and mortar type were also found.

The Committee has been fortunate in securing the continued services of Captain G. A. Gardner and Mr P. W. van Tonder for this (1936) season's work. As the Committee is satisfied that further work on Mapungubwe will not add materially to what we already know, Captain Gardner, who is in charge in the field, will concentrate on Bambandianalo.

Meanwhile Professor Leo Fouché has been appointed to publish

the report on the work done at Mapungubwe up to the end of the 1934–5 expedition. A second volume dealing with the later expeditions will be issued.

The position at the moment may best be summarized as follows :—

(1) The Northern Transvaal contains remains of extensive medieval settlements. Several of these, with walled structures that contain typical chevron, herring-bone, dentelle and chequer-board designs built into the walls, definitely belong to the Zimbabwe Culture. Others, with undecorated and inferior walling, are of various dates.

(2) The oldest material culture encountered (at Bambandianalo) is apparently that of a Bantu-speaking people who worked in copper. They were potters and pastoralists, and apparently of Sotho stock. The incompleteness of the investigations obviously precludes the possibility of a final pronouncement as yet.

(3) The next oldest culture (typified at Mapungubwe and in the upper strata of Bambandianalo) has been thoroughly investigated and an authoritative and final statement ought soon to be made.

This (Mapungubwe) culture arrived at the site fully fledged and is homogeneous throughout—the greatest depth of accumulation exceeds 20 feet. It is a culture of mixed elements, apparently borne by a Bantu-speaking people of Shona-Sotho stock ; the former from the north, the latter from the west.

(4) The occupants of Mapungubwe were metal-working pastoralists who practised arts and crafts typical of the Bantu-speaking people of South Africa. Though much of their pottery is similar to that recovered from the later occupation layers at Bambandianalo, and similar also to certain forms associated with the second and grandest occupation-period of Zimbabwe, there are differences that make it clear that the natives who manufactured so much pottery at Mapungubwe possessed a slightly different material culture from that practised at Zimbabwe, most probably due to the infiltration of certain cultural elements from the west. On the whole, the pottery found at Mapungubwe is much more varied and finer than anything hitherto found in the ruins of Rhodesia.

They possessed fine skill in metal work, whether the metal was gold, copper or iron.

(5) The culture contains many imported elements, notably a great variety of coloured glass beads from the East and Chinese porcelain. The earliest date assignable to the settlement is medieval—most probably post-medieval.

(6) The culture as a whole appears to be closely related to the second Zimbabwe period when, according to Mr Schofield, the main girdle-wall of the so-called ' Temple ' was built—a period during which goldsmiths flourished and considerable quantities of imported articles found their way into the hinterland of South Africa.

(7) The natives lived in huts, kept domestic animals, cultivated ground-nuts, beans, a variety of melon and millet—and therefore presumably made beer. They traded with foreigners in much the same way as remoter native tribes do today and it was through such trade that they acquired glass beads and knick-knacks from the Near and Far East.

I consider that their existence, which apart from the smiths of the tribe appears in every way to have been rather ordinary, has been given an unwarranted glamour by an over-emphasis of their work in gold, and such ceremonial practices as reflect phallic influences.

A synoptic view of the field so far explored and the material examined, tells us that some appreciable time ago the valley adjacent to Mapungubwe was occupied by a race apparently of Sotho stock. That these people lived there for some considerable time is proved by vast accumulations of midden material. Captain Gardner thinks that the folk who settled at Bambandianalo represent the vanguard of the invasion of South Africa by Bantu-speaking tribes. They were metal-workers (mainly copper), potters and pastoralists who probably enjoyed a better rainfall than their successors—certainly a much better rainfall than is enjoyed today.

There then appeared a tribe of Sotho-Shona stock which occupied the area, living both on the summit of Mapungubwe and in the valleys immediately below. Apparently they lived in amity with their neighbours, for the Bambandianalo deposits continue undisturbed despite the change in included elements. As already stated these folk were metal workers and also potters and pastoralists who cultivated various crops—and apparently were contemporary with those who occupied Zimbabwe during its grandest phase—a phase characterized by much gold-work and contacts between the natives and traders who came to South Africa apparently in search of precious metals, which they acquired in exchange for what we would term ' kaffir truck ', viz. coloured glass beads and the like.

The occurrence of these beads and of Chinese porcelain merely reflects the great daring of ancient mariners in the East, for it is known that Chinese and Indonesian ships sailed the Indian Ocean probably as

long as 2000 years ago. The Arabs, of course, are known to have sailed down the east coast of Africa over 1000 years ago. The first account of a specific emigration from Arabia to East Africa tells of a settlement as long ago as A.D. 684, though it is probable that some Persians arrived on the coast early in the 6th century. The next record of settlement, again Arabs, is in 739. According to early historians these folk lived a wandering life and mixed freely with the natives, until they were driven inland by the next wave of immigrants. We have records that take us up to the days of Portuguese control, *i.e.* over a period of nearly 1000 years—from the 6th to the 16th centuries. From the beginning of the 16th century, our main source of information is derived from the records of the Portuguese, but little that is really more than provocative is said of the hinterland and the happenings there. What was going on at the time is not definitely known. We know only of Monomotapa and hear vague legendary talk of wars, powerful native chiefs whose tribesmen were known to have mined and worked in iron, copper and gold, and of great stone buildings, until in 1868 Adam Renders unknowingly pitched his camp on the site of the ruins of Zimbabwe itself, and so stumbled on what remained the greatest mystery of South Africa until the visit of Dr Randall MacIver thirty years ago. Unfortunately, between the time of Renders' visit and that of MacIver, the ruins had been rifled by treasure seekers, amateur archaeologists and other vandals and most of the best remains had been removed or seriously disturbed. This naturally complicated MacIver's work and rendered difficult also the work of Miss Caton-Thompson—and that is why Mapungubwe, Bambandianalo and the ancient ruins of the Transvaal are so important, for fortunately, they have escaped the vandal. The scientific excavation of Mapungubwe and Bambandianalo started with all their treasures undisturbed and we may legitimately hope that the work which is now going on—work which is sympathetically and generously supported by the State and the public—will throw very considerable light on the medieval history of South Africa.

Mapungubwe and Bambandianalo are merely two of numbers of similar settlements in the Zoutpansberg district of the Northern Transvaal, settlements that contain remains that seem to provide a link between the Zimbabwe culture so splendidly described by Miss Caton-Thompson[1] and the modern Venda settlements in the Zoutpansberg proper[2]; not only a geographical, but also a cultural and ethnological link.

[1] *The Zimbabwe Culture* (Oxford University Press, 1931).

[2] Hugh A. Stayt, *The Bavenda* (Oxford University Press, 1931).

Cambay and the Bead Trade

by A. J. Arkell

IN 'A note on certain Agate Beads', printed in the *Antiquaries Journal* (x, 149), Mr H. C. Beck drew attention to their obscure origin. In addition to a recent distribution of 500 to 1000 roughly made agate beads, which may have come from the sale of the belongings of an old sea-captain, Mr Beck gave fourteen finds unconnected with this recent distribution, which included a comparatively small example found by Woolley at Ur in a layer confidently pronounced to date from before the 'Flood', one bead from Algeria, a string from Jerusalem, one bead from an Irish bog, a string from near Frankfort, one bead from a Merovingian grave, a string from Brittany associated with the dolmen period, others from Nantes, Orleans and elsewhere in France, and four finds from the Sudan, two being from Omdurman, where it is stated that they are occasionally dug up, and one from the 25th Dynasty treasury of Sanam at Dongola.[1]

In the course of fifteen years service in the Sudan, I have seen numerous examples of these beads and also carnelian beads of apparently similar age in the possession of natives of the Sudan, especially in Darfur where fashion is frequently a century or more behind the more civilized Nile, and of pilgrims and itinerant bead-merchants[2] from Nigeria. There is indeed no doubt that these beads exist in some numbers in the Anglo-Egyptian Sudan, and probably all across Africa from the Red Sea to the Atlantic at this latitude, though they are now going out of fashion. In fact in the Sudan they are already out of fashion, and are most easily found today with old women who have put

[1] Mr D. B. Harden, Assistant Keeper of the Ashmolean Museum, informs me that there are four beads of grey mottled agate, well worn, of similar type to the above in Taunton Castle museum, which bear the following label: 'Agate beads similar to old Arab beads, said to have been found on Ham Hill, Somerset'. Presented by Mr E. Lovett. 1915.

[2] Nearly all itinerant bead-merchants (or rather pedlars) in the Sudan are the so-called Fellāta, *i.e.*, natives of northern Nigeria and occasionally Senegal. Bead pedlars are usually Hausa, and sometimes Fulani.

them away because their daughters do not want them, or with Nigerian bead-pedlars who have bought them up because they know several localities in West Africa where they are still in demand.[3] I have been frequently told by these bead-pedlars that the main sources of supply are the sites of old towns along the Blue, White and main Niles between Berber and Sennar or Kosti, where they are collected by children and others. From my own observation I know that they are collected from the site of old Sennar by Fellāta of the settlement at Mai Wurno on the Blue Nile which originated from Sokoto, and I have myself picked up a few examples in both agate and carnelian on this site. They are also said to be found near Kano and on other old sites in northern Nigeria.

All these beads have been bored from both ends ; in some cases more than one attempt has had to be made before the holes meet, and in others the holes meet at such a difficult angle that it is almost impossible to thread the bead.[4] In view of this fact, Mr Beck and I agreed that they were not recently made at Oberstein in Germany, as suggested by Mr F. Addison (*Sudan Notes and Records*, xv, 152–4),[5] and I decided to try to solve the mystery by making my own enquiries in the Sudan.

On my way back to my station in that country in 1934 I made a few enquiries on landing at Port Sudan, the chief port of the Sudan on the Red Sea. Mr Addison had suggested India as a possible source for these beads, and from the *Periplus*[6] and *Duarte Barbosa*[7] it appeared to me probable that this was correct ; but at Port Sudan I was informed by the chief Indian merchants that no beads of any kind are now

[3] Several such pedlars expressed the intention of selling carnelian beads of the type of FIG. 26 at Onitsha in southern Nigeria, where it is said they are cut up into smaller beads ? by Yoruba.

[4] Compare a footnote to the chapter of the Ant in Sale's edition of the Koran, where a story is quoted from Al Beidawi of how the Queen of Sheba, in order to try whether Solomon was a prophet or no, sent him among other things an onyx drilled with a crooked hole, and Solomon solved the difficulty by ordering a worm to pass a thread through the onyx.

[5] There is a different type of agate bead, whose prototype occurs at Mohenjo-daro in the 3rd millennium B.C., which is still being made at Idar near Oberstein in Germany from agate of Brazilian origin, and being imported into the Sudan, together with imitations in glass from Czechoslovakia ; on which I hope to publish a note later.

[6] *The Periplus of the Erythraean Sea*, trans. by W. H. Schoff. 1912.

[7] *The Book of Duarte Barbosa*, trans. and ed. by M. L. Dames. (Hakluyt Society, 1918).

imported into the Sudan from India direct. They however put me in touch with a small merchant called Abd el gawād el Baghdadi, who had spent a lifetime in retailing beads and similar trinkets. He told me that any beads of recent Indian origin in the Sudan have probably come *via* a native of Cambay called Abdelrahīm Fajju, who used to reside in Cairo, and obtained from Cambay the beads with which he supplied merchants in the Sudan.

The only beads of Indian origin which Abd el gawād had in stock were large oval beads of an inferior moss agate, which he had obtained from this Cambay merchant in Cairo, and which he sold to local Arabs at about a shilling each.

Further enquiry among the merchants of Omdurman only confirmed this information. I found at least one merchant who had obtained carnelian and agate beads from Abdelrahīm Fajju: and I therefore wrote to him. My letter was answered by Ghulam Ahmed Hindi, also a native of Cambay, who is now carrying on Abdelrahīm's business in Cairo.

At my request Ghulam Ahmed obligingly sent me from his stock samples of a number of agate and carnelian beads which were all obtained by him from Cambay, where they had been made. The first are illustrated in FIGS. 1, 2, 3, 21 and the carnelians in 9–14.[8]

It now appeared probable that the beads of FIG. 3 were the modern counterparts of the agate beads of uncertain origin to which Mr Beck had drawn attention, and that those of FIG. 14 were the same form as the eight-sided date-like carnelian beads[9] (see FIGS. 15 and 26), which may be found in the Sudan today, and of which I have picked up examples on the site of old Sennar and on other old village sites on the banks of the Blue Nile in that vicinity.

I therefore sent Ghulam Ahmed two typical forms of Sudan agate beads, a tapering barrel and a fatter bead with abruptly cut-off ends (FIG. 19), and asked him whether he could supply exactly these

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[8] The Arab trade-names used by Ghulam Ahmed for the beads are as follows:—

SEMLAK: of doubtful meaning; Ghulam Ahmed thinks it is a Barabra word meaning 'long', but I have not been able to confirm this.

RAQABA: 'neck', and so 'necklace'.

MAKARRAR: 'repeated', and so 'similar', 'well-matched'.

MAGHRABI: so called because its best sale is to Maghraba of Kano.

[9] These beads are on the average about $1\frac{1}{2}$ inches in length, with maximum diameter of about 1 inch at one end, and a minimum diameter of about $\frac{1}{2}$ inch at the other. They have really a square cross-section with the corners shaped off.

two types of bead. He replied that both these beads are undoubtedly Cambay beads of the type of FIG. 3, and that the only difference is that those in FIG. 19 are worn with use, and have so lost their polish, the absence of which alters the general appearance of the bead. He added that the white stone of which these beads are made is also found naturally tinted with red or yellow, indicating that the difference in colour and grain between FIGS. 3 and 19 is insignificant.

Ghulam Ahmed further informed me that agate beads of the type of FIG. 3, and carnelian beads of the types of FIGS. 9, 10 and 14 are all exported to Nigeria, and especially to Kano, by middlemen such as himself. The beads are sent from Cairo by parcel post to Kano (*via* Liverpool and Lagos). Previously they were sent direct across Africa by caravan, the journey taking about six months, as compared with one month by parcel post. This is not inconsistent with the fact that a large proportion of the agate and carnelian beads, which I collected recently in the Sudan, mostly at El Fasher and from wandering Nigerian pedlars (some examples collected are shown in FIGS. 6–8, 15, 20, and 23–26), were said to have come from Kano and neighbouring towns in northern Nigeria,[10] and there is a string of these agate beads in the Pitt-Rivers museum obtained in Kano market by Professor Henry Balfour in 1930.

In order to check Ghulam Ahmed's information, I wrote to the British Legation at Jedda, for in *Sinai, the Hedjaz and Soudan*, James Hamilton states that when he had been at Jedda in 1854 there were merchant vessels sailing to Bombay every autumn, and that there were then 1500 Indians resident at Jedda including many of the wealthiest merchants. He also recorded having seen carnelian beads for sale in their shops.

The Minister very kindly replied to my enquiries that at the present day nearly all the agate beads and all the carnelian obtainable at Jedda are imitations imported from Danzig and Germany, though a very small quantity of agate beads imported from Cambay may occasionally be found on the market. He suggested I should be able to obtain from M. Husni Gama & Bros., an Indian firm at Mecca, any specimens I might require. I therefore wrote to this firm, sending them three different examples of the agate beads still obtainable in the Sudan and one carnelian ' date ' bead (FIGS. 7 and 15), and told them I wished to

[10] The site of old Zamfara has several times been mentioned to me by pedlars as being a source of these beads. According to Hogben, *The Mohammadan Emirates of Northern Nigeria*, p. 107, Zamfara was only founded in the 18th century A.D.

trace where they were made ; and I asked them to send me a few examples, if any were on sale in Mecca today.

In answer to my request they sent me 17 agate and 6 carnelian beads (FIGS. 5 and 16), and stated that all these beads came from Cambay, being brought to Mecca by Indian pilgrims, who sold them in small quantities and at higher prices than those prevailing in the Sudan today. While in the Sudan the usual price is now 1 to 2 P.T. ($2\frac{1}{2}d$ to $5d$) a bead, they had to pay 18*s* for the 23 beads sent to me.

As a further check, I also wrote to Messrs Ranchodlal, Girdhurlal & Co. of Bombay, who were recommended to me by the Minerals Adviser, India House, London, as lapidaries of considerable experience. I sent them two examples of agate bead obtained in the Sudan (FIGS. 6 and 8). They replied that these beads are of Cambay manufacture, and that, being still in vogue, they could be supplied in any quantity. They added that these beads are at present exported from Cambay to Persia as well as to Egypt. They wrote :—' As the designs in the beads are natural ones, you cannot expect to have all of the same types and sizes. . . . You need not send any further specimens, as they are . . . made in India . . . in Cambay, and nowhere else '. With their letter they very kindly sent me free of charge seven specimens (FIG. 4) which they consider match my samples (FIGS. 6 and 8). They also sent me the following report on agates, which is of such interest that I reproduce it here :—

' The agate is a quartz stone usually containing silica, with proportions of alumina coloured by oxide of iron. It is generally found in round nodules or in veins in trap rocks, and sometimes in beds of streams. The chief varieties of agates are Chalcedony with colours in parallel bars ; Carnelian or red chalcedony ; Mokha stones ; Moss agates ; Blood stones ; Plasma, a grass green stone ; and Chrysoprase, an apple-green stone. These are found in different parts of Gujrath within a radius of about 120 miles of Cambay. The Bhils are the miners '.

' In its natural state the agate is of a dull cloudy brown or yellow colour. After being dug out of the mines they are divided into two classes, those which should and those which should not be baked. The former are spread out in the sun, and are then baked in earthen pots by means of a fire made with goat- or cow-dung cakes. By exposure to the sun and fire, the colours of the stones are deepened and become more pronounced. The stone then passes through the three processes of sawing, chiselling and polishing '.

PLATE I

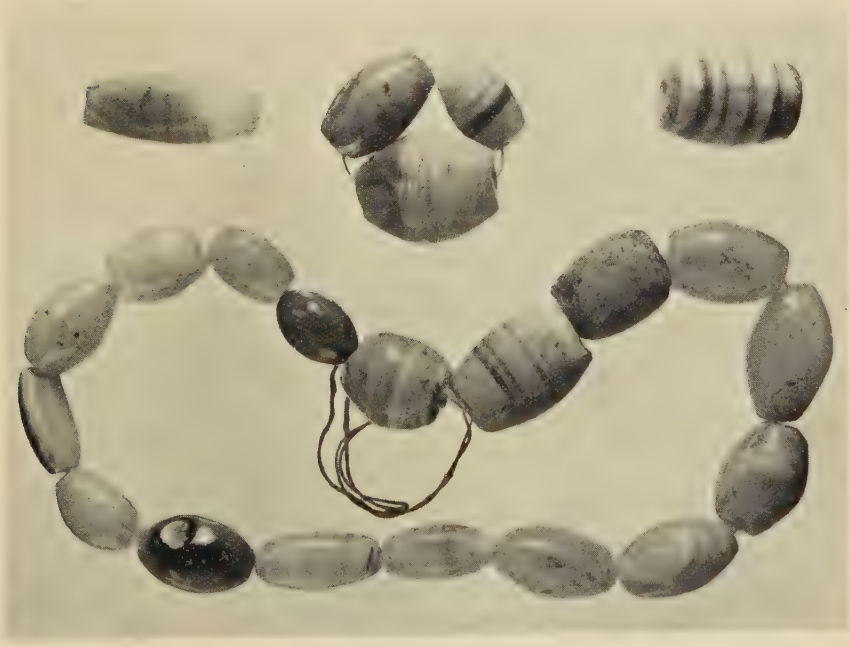
1 2 3

4

FIGS. 1–3. AGATE BEADS IMPORTED FROM CAMBAY BY GHULAM AHMED HINDI OF CAIRO
(1) egg-shaped, aqiq necklace; (2) ash coloured aqiq; (3) white semlak

FIG. 4. AGATE BEADS MADE AT CAMBAY SUPPLIED BY MESSRS RANCHODLAL, GIRDHURLAL & CO., OF BOMBAY

8 7 6



5

FIGS. 5. MIXED STRING OF OLD AND NEW AGATE BEADS OBTAINED BY MESSRS HUSNI GAMA FROM INDIAN PILGRIMS AT MECCA—ALL SAID TO BE MADE AT CAMBAY

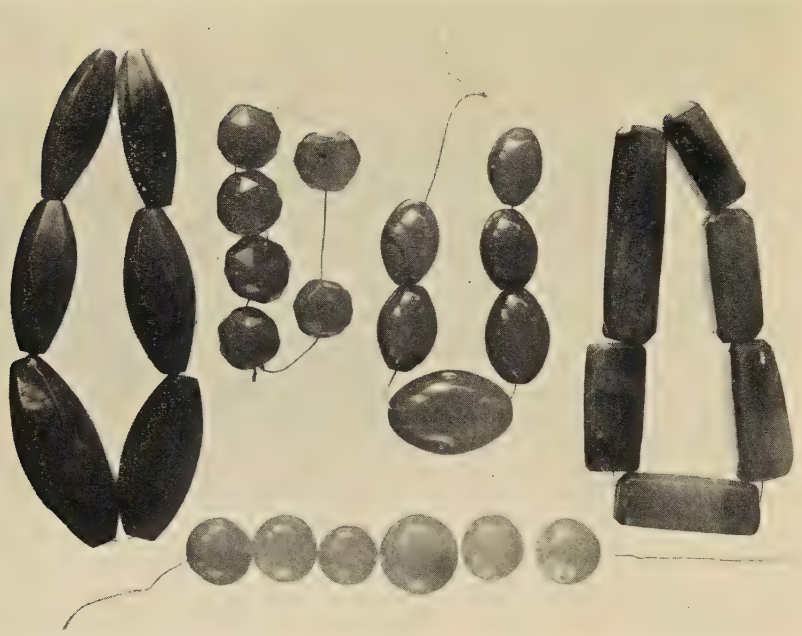
FIGS. 6 & 8. AGATE BEADS OBTAINED AT EL FASHER AND SENT TO MESSRS RANCHODLAL AS SPECIMENS. Cp. FIG. 4.

FIG. 7. AGATE BEADS SAID TO COME FROM KANO, OBTAINED AT EL FASHER, AND SENT TO MESSRS HUSNI GAMA OF MECCA AS SPECIMENS. Cp. FIG. 5.

facing p. 296

PLATE II

12 11



13 10

9

FIGS. 9–13. CARNELIAN BEADS IMPORTED FROM CAMBAY BY GHULAM AHMED HINDI OF CAIRO: (9) plain red aqiq; (10) Maghrabi semlak aqiq; (11) egg-shaped red aqiq; (12) round faceted red aqiq; (13) red semlak aqiq.

14 15

16

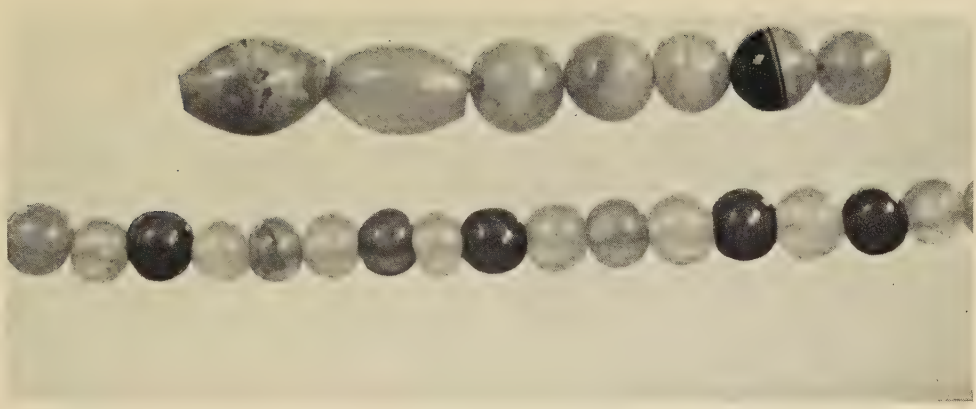
FIG. 14. CARNELIAN BEAD OBTAINED AT ZALINGEI IN DARFUR, AND SENT TO MESSRS HUSNI GAMA OF MECCA AS SPECIMEN. Cp. FIG. 16

FIG. 15. CARNELIAN BEADS IMPORTED FROM CAMBAY BY GHULAM AHMED HINDI OF CAIRO

FIG. 16. CARNELIAN BEADS OBTAINED BY MESSRS HUSNI GAMA FROM INDIAN PILGRIMS AT MECCA, ALL SAID TO HAVE BEEN MADE AT CAMBAY

PLATE III

17



18

FIGS. 17–18. BEADS IN THE TRADESCANT COLLECTION AT THE ASHMOLEAN, PROBABLY FROM CAMBAY

(17) agate ; (18) alternate pink carnelian and white agate.

19 20 21

22

23

FIGS. 19–23. AGATE BEADS

(19) Two beads bought at El Fasher and sent to Ghulam Ahmed as specimens. Cp. FIG. 3. (Thick one from Sokoto, thin one from near Khartum).

(20) Beads bought at El Fasher from Nigerian pilgrims.

(21) Semi-transparent white beads recently imported from Cambay by Ghulam Ahmed of Cairo.

(22) Beads from grave at Uri in Northern Darfur, date ? between 1200 and 1600 A.D.

(23) Beads bought in Darfur.

PLATE IV

24

25

FIGS. 24–25. AGATE HEADS OBTAINED IN DARFUR:
(24) from Nigerian pilgrims; (25, centre) from pedlars and others who had brought them from Omdurman and elsewhere on the Nile.

FIG. 26. DATE-SHAPED CARNELIAN BEADS PURCHASED IN DARFUR FROM NIGERIAN BEAD PEDLARS AND OTHERS

'When a stone is to be sawn, it is firmly fixed in a strong frame composed of two uprights, joined at the foot by a bar, the cement holding the stone being made of beeswax and cloth fibres. The saw is a thin toothless iron plate, one edge of which is fixed in a light wooden frame and according to the size of the stone is worked backwards and forwards by one or two men. A mixture of ground emery, fine sand and water is kept dropping into the cleft gradually made by the saw and these materials assist in cutting through the stone'.

'To chisel into shape, the stone is laid against the edge of a spike driven into the ground till only the head is left above the surface. The workman then strikes with a horn-headed hammer that portion of the stone to be broken off, till all roughness has been removed'.

'The article is now handed over to the polisher. He takes it to a platform whereon are two strong wooden uprights, and between the uprights a wooden roller, fastened into a head at one end. This roller works on an iron spindle or axle. On the one end the axle is screwed and fitted with a nut to which a plate or disc can be made fast. The grinding or polishing plates are made of copper, wood or emery mixed with seed lac. The emery is carefully powdered and its preparation varies in fineness according to the nature of the work. Copper plates are only used for polishing very hard stones, and wood for the softer variety. The disc best suited to the stone to be polished is fastened to the roller by the workman who, squatting on his hams, steadies the machine with his foot. A bow with its string passed round the wooden roller, is held in his right hand, and by moving the bow backwards and forwards, the roller and with it the polishing plate is whirled round, while the article to be polished is held in the workman's left hand, and is pressed against the outer face of the polishing disc as it revolves'.

'After the beads have been chiselled into shape, to smooth their surfaces a number are fixed in wooden or bamboo clamps, and rubbed on the coarse and hard smoothing stone. Next they are clasped in a grooved cramp and rubbed along a wooden polishing board. The surface of this board is cut into grooves and is coated with a composition of emery and seed lac. To give them their final brilliancy, beads are polished with a mixture of emery dust and fine carlinian powder placed in a strong leather bag about 1 foot by 2 feet. The mouth of the bag is tied, and a flat leather thong is passed around its centre. Seated at opposite ends of a room, two men, each holding one end of this leather thong, drag the bag backwards and forwards, making it and its contents revolve. This process lasts from ten to fifteen days, during the whole

of which time the bag is kept moistened with water. After polishing, the beads are bored by a diamond-tipped steel drill, water being dropped into the hole through a thin narrow reed or metal tube. Knife handles are prepared in the same way '.

' In making cups, saucers and other hollow articles, the outside is first chiselled into shape and ground on the smoothing stone. To hollow the inside the diamond-tipped drill is worked to the depth of a quarter of an inch all over the upper surface until it is honey-combed with drill holes. The spaces between these holes are then chipped away till a hollow is formed, and the process is repeated until the desired depth is attained. The inside is then polished on a cone composed of the same materials as the polishing discs. Flat ornaments, such as paper-cutters, paper-weights and ornamental slabs are sawn into layers of the required thickness and polished in the ordinary way. The working of agates takes a considerable time, but when the stones are fine specimens the results repay the labour expended upon them '.

' The introduction of artificial agates in Europe has seriously interfered with the industry in recent years, the result being that the working of natural stones has ceased. Certainly, modern appliances must be used to simplify and expedite the grinding and polishing processes to revive the old industry of Cambay. The workmen employed in the industry should be intelligent, and merchants dealing in this trade should employ modern methods of advertising and pushing the merchandise. Even then, it is a question, whether this trade can flourish in the absence of importers from other countries '.

The earliest definite reference in literature to the export of agate and carnelian from this part of the world to Egypt, etc., that I know is in the *Periplus* (*c.* A.D. 60), in which the export of *ὀνυχίνη λιθία καὶ μουρρίνη* from Barygaza (=modern Broach) is mentioned. Schoff in his edition (pp. 42 and 193) translates this ' agate and carnelian ', and further suggests with a considerable degree of probability that the ' onyx stone ' of Genesis II, 12, which reached the ancient world through the ' land of Havilah ' on the Persian Gulf, was Cambay agate. Compare also Ezekiel, XXVII, 16, where the prophet is speaking of Tyre: ' Syria was thy merchant by reason of the multitude of wares of thy making ; they occupied in thy fairs with emeralds, purple, and broidered work, and fine linen and coral and agate '. Here we probably have a reference to agate that had come from India overland from the Persian Gulf to Aleppo. Schoff also points out that the murrhine, which

first became known to the Romans after the conquests of Pompey the Great in Asia (*Pliny*, XXXVII, 7, 8) was probably Cambay agate.[11]

The export of agate and carnelian from Cambay is mentioned in the *Travels of Ludovica di Varthema*[12], which took place between 1503 and 1508. Varthema's first stop in India was at Cambay, of which he says 'an immense quantity of cotton is produced here, so that every year forty or fifty vessels are laden with cotton and silk stuffs, which stuffs are carried into different countries. In the Kingdom of Combeia also, about six days journey, there is a mountain whence cornelians are extracted, and the mountain of chalcedonies'.

The first definite mention of the export of agate and carnelian beads from Cambay, of which I am aware, is in *The Book of Duarte Barbosa*,[13] for drawing my attention to which I am indebted to Prof. C. G. Seligman.

Barbosa, who completed his account of the countries bordering on the Indian Ocean about 1518, was a Portuguese official in the service of the Portuguese government in India from 1500 to about 1516. When at about the beginning of this period, the Portuguese made their way along the coast of East Africa, they found that all the trade of the ports they touched at was connected with the great kingdom of Cambaya. In Barbosa's account, Cambay beads are described as one of the important articles of trade brought from India to the Red Sea and the East Coast of Africa by Mohammedan sea-faring traders, whose long established monopoly of the trade between the Mediterranean[14] and India and the Far East, *via* the Red Sea, the Portuguese were at that time endeavouring with considerable success to break. The indication is that this trade in Cambay beads had been going on for a long time, and though I know no explicit references in literature to the export of agate from Cambay between the Periplus and the sixteenth century, the

[11] There is an apparent allusion to the working of agate and carnelian by Indians in Philostratus' *Life of Apollonius of Tyana*, written A.D. 217 (p. 291 of vol. I in the Loeb edition), bk. III, ch. 27 :—' Now the precious stones imported from India are employed in Greece for necklaces and rings because they are so small, but among the Indians they are turned into decanters and wine coolers, because they are so large, and into goblets of such size that from a single one of them four persons can slake their thirst at midsummer'.

[12] Hakluyt Society edition, pp. 106, 107.

[13] *loc. cit.*, vol. I, pp. 6, 12, 15, 33, 136, 137, 142–45.

[14] Previous to Portuguese interference, merchandize from the East was landed at Suez, and taken by camel to Cairo, where other merchants took it to Alexandria, and sold it to Venetians.

possible literary sources are few ; and I see no reason why Cambay agate and carnelian should not have continued to form one of the staple commodities of the Red Sea–Indian trade, which no doubt continued without a serious break through these fourteen centuries.

I can best give an idea of the extent of the trade in Barbosa's time, by giving the following extracts (pp. 6 ff.) from his work :—

> At Sofala (1505) the Mohamedans had dwelt for a long time, by reason of the great traffic which they carried on with the heathen of the main land and the manner of their traffic was this : they came in small vessels named *Zambūcos* from the kingdom of Quiloa, Mombaça and Melynde, bringing many cotton cloths . . . and many small beads, grey, red and yellow, which things come to the said kingdoms from the great kingdom of Cambaya in other greater ships.[15]

Beyond Sofala inland lay the ' great kingdom of Benametapa pertaining to the heathen '. Here too beads from Cambaya were greatly esteemed. We also read of a ' very great town of Moors ' (*i.e.*, Mohammedans) ' called Angoya ', (which Barbosa's editor suggests was on the northern branch of the Zambesi). ' In it dwell many merchants who deal in gold, ivory, silk and cotton cloths and Cambay beads '. Mombasa is described as full of ships from Sofala, Cambaya and Zanzibar. Berbera too, ' whither go many ships carrying much merchandise from Adem and Cambaya '. The city of Adem[16] was visited by ships

> from all parts more especially from the port of Juda (Jedda), whence they bring copper, quicksilver, vermilion, coral, and woollen and silken cloths, and they take thither on their return great store of spices, drugs, cotton cloths, and other wares of the great kingdom of Cambaya. From Zeila and Berbera too come many ships with foodstuffs in abundance ; in return they take back Cambay cloth and beads both large and small, and all the goods in which they trade from Arabia Felix and Preste Joan's country also come here, as do the ships of Ormuz and Cambaya and those of Cambaya come laden with cloth of many kinds : so great is the number of them that it seems an astonishing thing ! And as I have already said, they bring cotton, drugs (great quantity), gems, seed pearls in abundance, *alaquequas* (=carnelian, from the Arabic AL 'AQIQ').

Of Gujerat and the ' fair city of Cambaya ' Barbosa records (pp. 136 *passim*) the following :—

> Further on after leaving Barbasy there is a place called Guindarim (Ghandhar) at the mouth of a river with a very good harbour, in which all sorts of goods are dealt with, for the reason that the great city of Cambaya is situated further up the

[15] There is no reason to think that glass beads are indicated. This description fits well enough the beads exported from Cambay today.

[16] *i.e.* Aden, on whose trade with India Ibn Batuta had expatiated two centuries before.

same river. Hither come ships from Malabar . . . and they take away . . . carnelians (*alaquequas*) and other wares, by which they make great profits in India.

At Cambay are many skilful turners who make . . . beads of sundry kinds, black, yellow, blue[17] and red and many other colours, which are carried hence to many other places. Here too are many workers in stones. . . . A great amount of work is also done here in coral, *alaquequas* (carnelians) and other stones ; so that in this city the best workmen in every kind of work are found.

Beyond this City of Cambaya, further inland, is a town called Limadura. Here is found an *alaquequa* rock which is a white, milky or red stone which is made much redder in the fire. They extract it in large pieces and there are cunning craftsmen here who shape it, bore it, and make it up into divers fashions, that is to say, long, eight-sided, round and olive-leaf shapes. . . . The dealers come hither from Cambaya to buy them and they [thread them and] sell them on the Red Sea coast, whence they pass to our lands by way of Cairo and Alexandria. They take them also to Arabia and Persia, and to India where our people buy them to take to Portugal. And here they find great abundance of *Babagoure*, which we call . . . chalcedony, which are stones with grey and white veins in them, which they fashion perfectly round, and after they are bored the Moors wear them on their arms in such manner that they touch the skin, saying that they are good to preserve chastity ; as these stones are plentiful they are not worth much '.

Barbosa's editor, M. L. Dames, shows that Limadura is Limodra, close to Ratanpur in the Rajpipla State. It is on the banks of the Nerbudda, which is navigable from Broach.

He states that in the beginning of the 17th century the seat of the carnelian industry appears to have been transferred from Limodra to Cambay, and after that date only the preliminary operations of sorting the stones and exposing them to fire to develop the colour were performed at Limodra. They were then taken to Cambay to be cut, polished and worked up. Limodra is within four miles of the mines. Its ruins testify to its having been a place of great importance as early as the beginning of the 11th century, and an inscription found there is dated A.D. 1004.

Even now the preliminary operations of sorting and exposing the stones to fire to develop their colour are carried on there.

Further corroboration of the above is given in Dr Watt's *Dictionary of the Economic Products of India*, vol. II, columns 614–619, from which the following information is extracted :—

Agate in India is mainly obtained from the mines of Rewa Kantha in the Bombay Presidency, but mines exist also in Bengal in the Rajmahal

[17] Blue probably means blue-grey, one of the shades of agate. Here again I see no reason to think the reference is to glass beads, of which the export from Cambay is never mentioned.

and Singbhum districts, in Hyderabad, and in the Central Provinces at Jabulpur.

Dr Watt divides agate into four kinds: common agate (of which he distinguishes a white, half clear, stone known as *dola* and a cloudy streaked one called *jamo*), moss agate, Kapadvanj agate, and veined agate.

Both kinds of common agate come from Kathiawar near Mahedpur in Morvi, three miles from Tankara. These stones are brought to Cambay dealers by merchants. When worked up common agate is greyish white, and being hard, brittle and massive, takes a high polish.

Moss agate comes from Budkotra, also three miles from Tankara: It shows, on a base of crystal, sometimes clear, and sometimes clouded, tracings as of dark green or red brown moss.

Veined agate, the most valued Cambay agate, comes from Ranpur in Ahmedabad. When polished, it shows a dark ground with white streaks, or dark veins on a light ground. Its colour is readily intensified by artificial means. It is boiled in oil and then in sulphuric acid to heighten its colour. Red varieties are produced by boiling it in a solution of proto-sulphate of iron, thus very often forming carnelians.

Mocha stones are clear greyish chalcedonies with clouds or dashes of rich brown of various shades. They probably owe their colour to art. They come from the Deccan trap.

Blood stone is dark green agate containing bright red spots like drops of blood.

Cambay and Broach hold their own as great emporia of carefully prepared carbuncles, carnelians and agate cups.

Carnelian is a reddish variety of chalcedony, but it is sometimes of yellow or brown colour. White carnelians are rare.

The principal source of carnelian is the mines of Ratanpur, about 14 miles from Broach.

Dr Watt confirms that when collecting pebbles the miners divide them into those of which the colour cannot be improved by burning (*i.e.* onyx, cat's-eye and yellow agate), and those of which it can (all others).

The latter are baked to bring out the colour. They are exposed to the sun in the hot season (March and April), and burnt for a day or two under pots in May. Good stones are carried to the Nerbudda and floated to Broach, where they are shipped in large vessels for Cambay and offered for sale to Cambay dealers.

The effect of exposure to sun and fire is to turn light shades of

brown to white and dark to chestnut. Maize-coloured stones become rosy-tinted, orange stones become red, and yellow stones become pinkish purple. Cloudy browns and yellows mixed become marked by bands of white and red. The hue of carnelian varies from palest flesh to deepest blood red. The best are a deep clear and even red, free from cracks, veins or flaws[18]. The larger and thicker the stone, the more valuable.

Onyx resembles agate closely, but with the colours arranged in flat horizontal planes.

The result of my enquiries is that I am convinced that all the agate and carnelian beads of the types described in this article as still to be found in use in the Sudan, have come from Cambay ;[19] and that they have reached Egypt (and so Europe and North Africa) or the East African coast direct both by sea, and overland *via* Persia, ever since the industry was started ; the primitive method by which these beads are made today being an indication that the industry is a very old one.

The export of agate and carnelian beads from Cambay has diminished considerably in volume of recent years, owing to the fact that these beads have largely gone out of fashion, as has happened for example in the Sudan, where Czechoslovakian glass imitations are preferred as being smarter.

The most recent agate beads may be detected by their high polish. The oval agate bead with truncated ends seems not to be made at present, but both the Cambay distributor in Cairo, and a firm of Bombay lapidaries, and Indian merchants at Mecca,—both the latter of established reputation—assert without any qualification whatever that the agate and carnelian beads under discussion are examples of the types of beads still exported from Cambay today, only worn by use.

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[18] This probably explains why many chipped and so ancient looking beads are to be found in the Sudan.

[19] Further confirmation of this theory, if any is required, is provided by some agate and carnelian beads in the Tradescant collection at the Ashmolean, of which FIGS. 17 and 18 are examples. See my article ' Some Tuareg Ornaments and their Connection with India ' in J.R.A.I., LXV, 302. From their technique these beads appear to have come from Cambay, and since they appear to be respectively one of items 111 to 115, and item 116, in the original catalogue of 1685, in which Cambay is actually named as the source of some *granati* (red stones), the probability that they did come from Cambay is increased ; and becomes a practical certainty when they are compared with FIGS 5, 9 and 21, and some spherical beads of banded agate, which are occasionally imported from Cambay by Ghulam Ahmed, but of which I am unfortunately unable to represent an example.

I see no reason to doubt them. I recognize in these beads definite types, and one characteristic of beads is clearly that once a type is established as a favourite it will persist through the centuries, no two completely different localities producing exactly the same type of bead in the same material and with the same technique, though it may be impossible to tell at what date a bead of any given type was made, since the method of manufacture has remained unchanged for centuries.

The literary sources cited are sufficient in my opinion to establish that there has been a continual stream of agate and carnelian beads of these types from the Cambay vicinity to Egypt and the East Coast of Africa during the last 1900 years. This stream may have been, and probably was, at its greatest volume between A.D. 1300 and 1800, and I consider it probable that most of the beads of these types now to be found in the Sudan have reached that country since 1300, when Cambay came under Moslem domination on being conquered by the Delhi sultanate, this event presumably giving a fillip to Mohammedan trade, which seems to have been responsible for the introduction of these beads to the East Coast of Africa, and so probably to the Sudan, a similar market to that of East Africa. I would include all the four Sudan finds mentioned by Mr Beck under this category. The agate bead in the Pitt-Rivers Museum found in the treasury of Sanam by the late Prof. F. Ll. Griffith is accompanied by a carnelian bead, and it was admitted (*vide* Mr Beck's article) that these two beads might have been introduced into the treasury at some date later than that of the treasury itself. I have no doubt that they are both Cambay beads, and I think that under these circumstances it is highly probable that they were introduced into the cemetery at some much later date.

As for the finds at Omdurman, it is I think sufficient, in order to indicate their comparatively recent date, to draw attention to the facts that Omdurman only came into existence as a town of any size late in the 19th century, and that this type of bead was being imported until very recently by Omdurman merchants from Cambay through a Cairo middleman.

Indeed, those agate beads of the Cambay type which come from the Sudan, and to my knowledge can be assigned the earliest date, are three that were worn in the hair of a female skeleton in a 'Berber' or 'Saharan' type-grave which I excavated in 1935 at Uri in northern Darfur, where there is a large town of dry stone walls, of the history of which practically nothing is known. If tradition is worth anything, this town is connected with Tunis and Tripoli and can hardly be later

than A.D. 1600, and since these agate beads were associated with a large quantity of small glass 'pound' beads of obviously Venetian origin it is unlikely to be earlier than 1200.[20]

Similarly the hitherto accepted date of 1504 for the foundation of Sennar would appear to indicate at the earliest a medieval date for the beads found on the site of old Sennar, with the probability that those found on the surface do not go back to the date of the foundation of the town.

Yet, as already stated, I see no reason why agate and carnelian beads of these definite types should not have been made in Gujerat[21] in the time of the Indus civilization, and possibly even earlier; and thus conclude that there is nothing inherently improbable in the theory that all the agate beads discussed by Mr Beck[22] were made there.

[20] For other reasons I am inclined to assign the date of the foundation of Uri to the 13th century A.D.

[21] Cambay, as far as I know, is first mentioned by Masudi in 943.

[22] I do not, however, wish to dogmatize about the specimen which is dated from before the Flood!

Domesday Woodland in Southwest England

by F. W. Morgan

THE distribution of woodland and the stages of its gradual disappearance were of fundamental importance in the early historical geography of England. Wood was a valuable element in medieval economy and one of the chief factors affecting the nature of settlement. The evidence concerning the extent of the woodland in early England is of two kinds : (1) the surface geology, which provides a basis for the reconstruction of the original extent ; (2) the statistics of the Domesday Book : these refer to the eleventh century, but they may have some retrospective value. The present essay is an attempt to examine the Domesday evidence for the south and south-western counties of Berkshire, Hampshire, Wiltshire, Dorset, Somerset, Devon and Cornwall.

Our ideas of the nature and distribution of vegetation in prehistoric times are based upon ecological interpretation of the surface-geology. The clays and loams, particularly the heavy clays, were covered with dense woodland (probably oak) ; the coarser sands and sandstones, such as those of the Trias, the Greensand and the Eocene, carried more open woods and heaths (which in part represented degenerate woodland) ; while light woods were characteristic of the lower slopes of the Carboniferous Limestones, such as those of the Mendips.[1] On the Upper and Middle Chalk there was, it is now generally held, a much greater extension of the beech and ashwoods, and scrub, which now cover parts of it. But any tree growth on the Chalk was certainly comparatively open, so that this area, in relation to the heavily wooded lowlands, would have been favourable to human penetration.[2] It has been suggested that the loam soils derived from the brickearths, calcareous boulder clay, or Greensand, should be regarded as intermediate in type between the heavy clays and the chalk, and were likely to have carried similar comparatively open vegetation.[3]

[1] A. G. Tansley, *Types of British Vegetation* (1911), 76, 89, 148.

[2] Emphasized by Sir Cyril Fox, *The Personality of Britain* (2nd ed. 1933), 49.

[3] S. W. Wooldridge and D. L. Linton, ' The Loam-Terrains of Southeast England in their Relation to its Early History ', Antiquity 1933, vii, 297.

These inferences, based upon geology, form a valuable guide in discussing distributions of the Roman, Saxon and Scandinavian periods,[4] but it is obvious that, as time went on, the effects of continued clearing must have increasingly modified the direct consequences of soil and climate. It is not possible to be dogmatic about the factors involved in this clearing. In some regions dense woodland provided an obstacle to early settlement and persisted as negative areas ; in other regions, the localities of dense wood were those of most fertile soil and these, once clearing had taken place, became very positive areas in the settlement pattern. Nor is it possible to dogmatize about the extent and rapidity of this clearing. That it did take place is all we can say. Direct references in Anglo-Saxon charters are few, though King Alfred's words indicate that the work of clearing proceeded with the spread of settlement :

> We wonder not that men should work in timber-felling and in carrying and building, for a man hopes that if he has built a cottage on *laenland* of his lord, with his lord's help, he may be allowed to lie there awhile, and hunt and fowl and fish, and occupy the *laenland* as he likes, until through his lord's grace he may perhaps some day obtain *boc-land* and permanent inheritance.[5]

The distribution of certain place-name elements frequently gives valuable hints about the progress of early settlement and the clearing of wood. There are interesting correlations in the recent volumes of the Place-Name Society, *e.g.* in Essex, where the endings *leah* and *den* (denoting clearing and settlement in woodland) are distinct from the endings *ing* and *ingaham* (associated with early settlement).[6] Further,

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[4] As in the Ordnance Survey Maps, *Roman Britain* (2nd edition, 1928), and *Britain in the Dark Ages* (South sheet, 1935). In the latter the forest distribution of the Roman map was employed, the reason given being that clearing between the Roman period and 871 must have been almost negligible.

[5] ' Blossom Gatherings out of St. Augustine ', Brit. Museum, Vit. A, xv. f. 1 ; see F. Seebohm, *The English Village Community* (1883), 169.

[6] It is often assumed that where such settlement has advanced into clay land (woodland) it has become scattered. This undoubtedly occurred frequently, and an examination of the earliest one-inch sheets of the Ordnance Survey (1809–30), which are invaluable for this purpose, will show that scattered settlement is generally true of areas of Eocene beds and Clay-with-Flints, *e.g.* mid and south Berkshire and north and northwest Hampshire. But on the heavy clays there is much less coincidence—for example, the sixteen villages on the Gault and Kimmeridge Clays of the Vale of White Horse are almost entirely compact, and in the extensive cleared areas of Lias Clay in Somerset around Ilchester and on the Polden Hills, there is little scattering, though in a small area on the Dorset Lias there is a good deal. (Sheets 12, 13, 18, 19, 21).

much of the colonization which Professor Stenton traces from boundary-names was probably penetration into woodland :

> There is every reason to think that the village colonization which can be traced in the Middle Ages was only the last phase of a process which had begun before the oldest English records were written. Innumerable Domesday villages, as well as innumerable farms and hamlets, bear names which resemble or are identical with the names of boundary marks recorded in the old English charters, [names which] 'suggest movement outward from the core of some earlier settlement to some point on the border of its territory'.[7]

Although we have only hints to rely upon, it is evident that with the continued growth of population and the spread of settlement, the geological map can be no longer the sole guide to the distribution of woodland in the early Middle Ages. In 1086 appeared for the first time a precise and detailed record, the Domesday Survey, which included the amount of woodland in its description of each manor, in nearly every county in England.

In the eleventh century, woodland represented an important element in the rural economy. The woods of most medieval villages provided building and fencing timber, fuel, and, most important of all, ' pannage ' or feed for swine in the beechmast and acorns. Some villages possessed rights in woodland outside their boundaries, either as compensation for the lack of wood or in addition to their own. Thus in the south of Wiltshire a small vill Washerne (not existing now), held the right to take each year from Milchet Wood (nearly 15 miles away on the SE border) 80 loads, what was required for repairing houses and fences, and to pasture 80 hogs there ;[8] on the other hand, South Newton, nearby, having 200 acres of its own, possessed exactly the same rights in Milchet.[9] In Berkshire, under Henry II, the lord of the manor of Letcombe Basset, one Richard Basset, in making over to Abingdon Abbey certain rights at his manor of Chaddleworth, several

[7] F. M. Stenton, *Introduction to the Survey of English Place-Names* (1929), vol. I, part I, 39–40.

[8] D.B., I, 68. The reference is to the volume and folio in the Domesday Book, Record Commission edition, vols, I, II (ed. Abraham Farley), 1783 ; vols. III, IV (ed. Henry Ellis), 1816. Vol. I contains the Exchequer Domesday, for the greater part of England, and vol. III includes the Exon Domesday.

[9] D.B., I, 68. Five hundred years later, in the same village of South Newton, the tenants had to undertake the transport of timber to the lord's seat at Wilton : Roxburghe Club, 'Survey of the Lands of William First Earl of Pembroke', ed. C. R. Straton, (1909), 31.

miles away, reserved for himself rights in its woodland to fuel, building timber and pannage because Letcombe Basset possessed no woodland.[10]

In the Survey two main types of formula were employed for recording the amount of woodland. The first was in terms of swine :[11] sometimes, as in Herefordshire, the entry gave the number of swine the wood was capable of supporting, but more frequently, as in Berkshire and Hampshire, the entry ran ' there is wood worth x swine from the pannage ', (*Silva de x porcis de pasnagio* or *Tantum silvae unde exeunt x porci de pasnagio*)[12] *i.e.* the fraction of the total kept by the villeins which was due to the lord. Thus the woods of Sonning near Reading were worth (*de*) 300 swine,[13] those of Monks Sherborne in north Hampshire 23.[14] The second formula was in terms of linear measurement : in Wiltshire, Dorset, Somerset, Devon and Cornwall the statement ran ' there is wood x leagues in length and y in breadth ' ; thus Amesbury had a wood 6 leagues in length and 4 in breadth,[15] Swell in Somerset a wood 5 furlongs and 10 perches in length and 2 furlongs in breadth.[16] In addition to these two main types, small amounts were sometimes stated in acres, frequently in Devon and Cornwall, and occasionally in the other counties. Where acres were employed they may not have implied the same everywhere, for the customary acre varied slightly in different parts of England, and an acre of wood was sometimes larger than the customary acre.[17]

All these statements were made in a precise fashion which suggests care in estimation if not measurement, but one or two qualifications are needed. The distribution of pannage capacity or of pannage rents may be taken as a reliable index of the occurrence of definite woodland ; where the dimensions were given, however, it must be remembered that the league seems to have consisted of 12 furlongs or $1\frac{1}{2}$ miles.[18] The ultimate authority for this reckoning is a Battle Abbey Register, where it is stated that the league contained 12 quarentines or furlongs, and the quarentine 40 perches.[19] It is difficult to say what exactly

[10] J. H. Round, *V. C. H. Berkshire* (1906), I, 310.

[11] See H. C. Darby, (1) ' Domesday Woodland in East Anglia, ANTIQUITY (1934), XIV, 211 ; (2) 'The Domesday Geography of Norfolk and Suffolk', *Geog. Journ.* (1935), LXXXV, 432 ; (3) *Studies in the Historical Geography of England before* 1800 (1936), 200–202.

[12] *e.g.* Windsor. D.B., I, 56b.

[13] D.B., I, 58. [14] D.B., I, 45b. [15] D.B., I, 64b. [16] D.B., I, 92.

[17] F. W. Maitland, *Domesday Book and Beyond* (1897), 373–6.

[18] *Ibid.* 371, and O. J. Reichel in *V. C. H. Devon* (1909), I, 387.

[19] *Monasticon Anglicanum*, III, 241.

these dimensions implied or whether they were exaggerated. J. H. Round held that the smaller entries represented actual measurements, but that the lengths of a league or more must have been exaggerated.[20] F. W. Maitland held that the compilers had in mind shapes as well as superficial content or size :

> The jurors are not speaking of superficial content, they are speaking of length and breadth, and they are either giving us the extreme diameters of irregularly shaped woods and pastures, or (and this seems more probable) they are making rough estimates of mean diameters.[21]

In a few entries the area formed by taking the dimensions as sides of a rectangle is greater than that of the present-day parish, and in the south of Somerset the recorded woodland of several manors would overlap if plotted in this way (*e.g.* Drayton[22] and Curry Rivel,[23] Ilminster [24] and Ashill).[25] In the majority of entries, however, the dimensions are much smaller and raise no such problems, for the rectangles are of such a size as might reasonably have belonged to a community at a time of much wider spreading woodland. Occasionally a wood was described as x leagues '*inter longitudinem et latitudinem*' or '*in longitudine et latitudine*'.[26] Here the areal league of 12 square furlongs or 120 acres seems to have been implied.[27] But a search for a precise meaning of these formulae is not only difficult : it is also unprofitable. If we cannot be sure of the actual amount of woodland existing in 1086, we can at any rate form some idea of its relative distribution. The diagrammatic method of plotting the dimensions as intersecting straight lines is a literal statement of the Domesday information and avoids any assumptions as to the areas implied.[28]

The apparently exaggerated area of woods in this minority of entries may be due, in part, to the fact that the unit of settlement, the vill, was not always co-extensive with the unit of tenure, the manor ; sometimes several vills, and therefore their woodland also, were included with one manor. Sometimes, too, such vills were geographically separate, and their woods cannot now be traced. This factor is not enough to invalidate wide distributions, and occasional adjustments

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[20] *V. C. H. Northants* (1902) I, 279–281.

[21] F. W. Maitland, *op. cit.* 371, 432. [22] D.B., I, 91.

[23] D.B., I, 86. [24] D.B., I, 91. [25] D.B., I, 92. [26] *e.g.* D.B., I, 64b.

[27] O. J. Reichel, *op. cit.* 387 and R. W. Eyton, *Key to Domesday, Dorset* (1878), 31.

[28] This method was first employed by Dr H. C. Darby in ' Domesday Woodland in Huntingdonshire ', *Trans. Camb. and Hunts. Archaeol. Soc.* (1935), V, 269.

S.W. ENGLAND: GEOLOGY
Alluvium
Clay-with-Flints; Tertiary
Limestone, chiefly Chalk & Oolitic
Heavy Clays
Granite
Other rocks
Scale of Miles
0 10 20 30 40

FIG. 1

can be made. In spite of this limitation a map formed by plotting the entries must represent a great deal of the distribution of woodland in 1086.

It is improbable that there was any other woodland unenumerated save that in the royal forests, the existence of which is responsible for the chief weakness in the distribution maps. These forests were not geographical but legal entities, areas outside (*foris*) the law of the land in which game was protected by special forest laws. At the time of the Survey they were not liable for geld and were therefore not enumerated except incidentally. The records of the following centuries, chiefly the Perambulations, describe the boundaries of land under forest law at the time, and are therefore of comparatively little geographical value.[29] Altogether, care is needed in differentiating between the terms ' woodland ' and ' forest '.

It is impossible to indicate the bounds of the forests of 1086, for to what extent they existed before the Norman Conquest ' is one of the vexed questions of English history '.[30] Probably their nuclei of woodland had long been reserved for hunting, but the Survey records something of the process of encroachment begun by King William. In south Wiltshire and east Berkshire there were a few references to woods or lands having been taken into the king's forest ; in southwest Hampshire, of course, they were more numerous, and most of the manors around the New Forest had no wood of their own but sent a number of swine into the king's forest.[31]

Many forests, at least, seem to have contained as a nucleus considerable areas of woodland, as shown by later records of grants of timber, gale havoc, etc.,[32] but at their widest extent they must have included much territory that was neither wood nor other ' waste '. In the Survey woodland entries were generally more numerous in the neighbourhood of the sites of later forests ; in northwest Wiltshire, for example, in the Oxford Clay belt, a number of woods lay near the forests of Chippenham and Melksham, while in the extreme north

[29] See M. L. Bazeley, ' The Extent of the English Forest in the Thirteenth Century ', *Trans. Roy. Hist. Soc.* (1921), ser. 4, IV, 148. For a general account of forests see H. C. Darby, *Studies in the Historical Geography of England before* 1800 (1936), 173–8.

[30] O. G. S. Crawford, ' Primitive English Land-marks and Maps ', *Empire Survey Review* (1931), I, 9.

[31] For the creation of the New Forest see F. H. Baring, *Domesday Tables* (1909), 194–205.

[32] J. C. Cox, *The Royal Forests of England* (1905), 69–70.

the forest of Braydon, an area almost devoid of settlement, had manors with very large woods to the east and west. In fact, in all the counties,

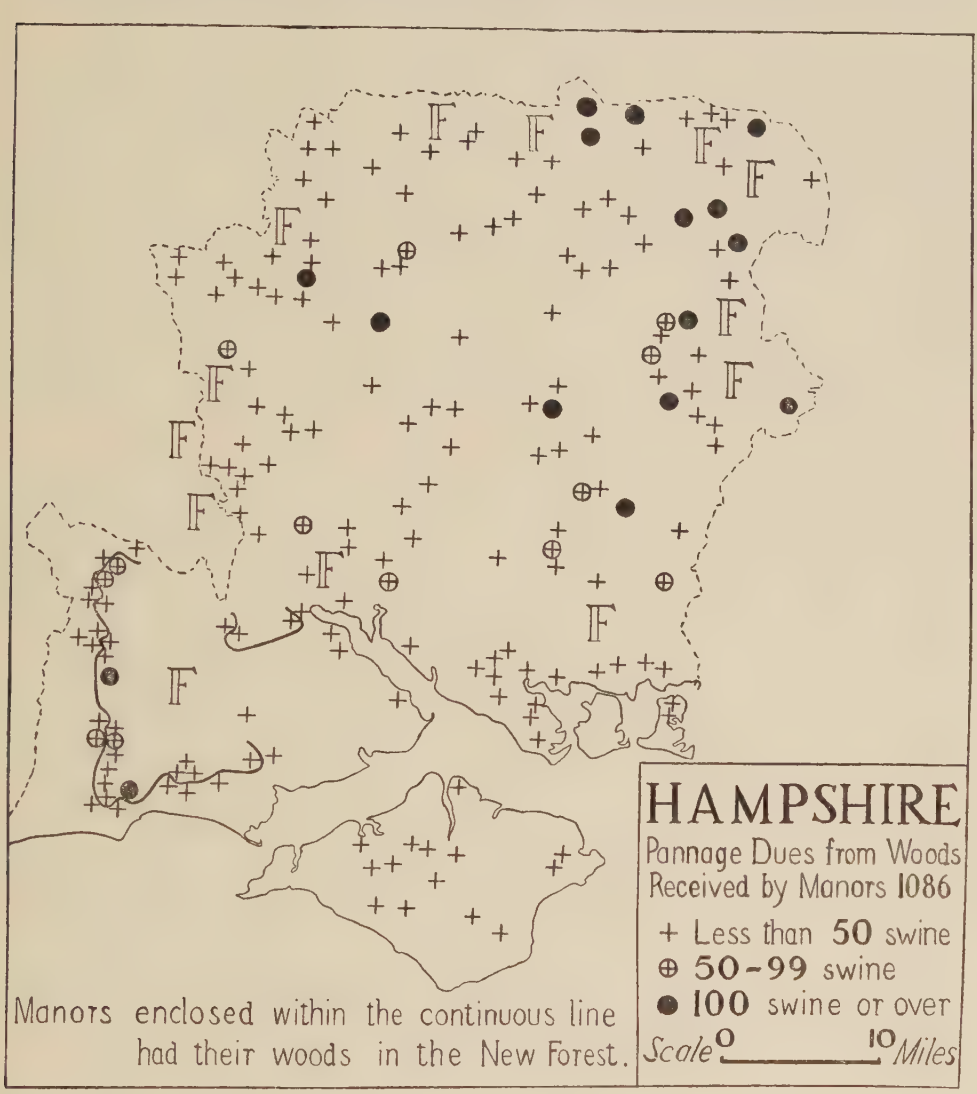
HAMPSHIRE
Pannage Dues from Woods
Received by Manors 1086
+ Less than 50 swine
⊕ 50-99 swine
● 100 swine or over
Scale 0 10 Miles
Manors enclosed within the continuous line had their woods in the New Forest.

FIG. 2

an area where a forest probably existed was generally surrounded by well-wooded manors.

The completed maps of woodland entries admit of no simple interpretation.[33] In spite of a number of marked concentrations they show a general dispersion and irregularity and by no means correspond with the geological distributions. (FIG. 1).

In Hampshire the woodland appears to have been widely scattered. This is to be expected, for the geology is varied around a central belt of chalk. In the east the county extends into the clays of the Weald ; the north includes considerable areas of Eocene beds ; in the northwest the chalk is largely overlain by Clay-with-Flints, and in the southwest are Eocene beds again. In these areas the pannage dues tended to be higher, but not notably ; they were certainly higher in groups around the forests. An outstanding feature of the map is the frequent mention of pannage dues, some of them very large, in the villages of the Avon valley bordering the New Forest ; half of these manors or holdings kept their swine within the bounds of the forest.[34] (FIG. 2).

The distribution in Berkshire is most interesting when compared with the geological map. The south and east of the county was well wooded, as today ; this is an area of Eocene sands and clays, or of chalk largely covered with Clay-with-Flints, though the higher parts of the chalk plateau, near the actual scarp, are bare. North of the scarp are the vales of White Horse and Thames, consisting of Gault, Kimmeridge and Oxford Clays, with smaller areas of Coral Rag and sands, the whole of which originally must have been well wooded. Yet the Survey records practically no woodland here, and there were no forests.[35] This situation was reflected in the facts of the contemporary

[33] In the construction of these maps (1) the entries in acres have been plotted in the same way as rectangles of equal size ; (2) in those few entries where a wood is described as ' x leagues in length and breadth ' the leagues have been taken as areal leagues of 120 acres each, following O. J. Reichel and R. W. Eyton *op. cit.* (a decision has to be made arbitrarily, and in a paper, ' Woodland in Wiltshire at the Time of the Domesday Book ', *Wilts. Arch. and N. H. Mag.* (1935), XLVII, 25, the formula was taken to mean the sum of the length and breadth) ; (3) the sign ' F ' has been inserted on the sites of the later forests (see M. L. Bazeley, *op. cit.*) ; it must be remembered that the forest of Exmoor was less likely than the others to have contained trees.

[34] See also F. H. Baring's map of the New Forest, *op. cit.* 197.

[35] F. H. Baring, *op. cit.* 41, remarks on north Berkshire, without adducing any evidence, ' There is at least strong ground for suspicion that the entire absence of any mention of woodland in these hundreds was due, not always to nature, but also to omission in the returns ', and suggests that near the Thames the area ' must have been well furnished with woods '.

human geography, for in 1086 this area was much more important economically than the Chalk and Eocene areas to the south which had retained their woodland (see *infra*).[36] (FIG. 3).

In Wiltshire, through which the great belt of clays continues, the situation was partly similar, but only the northeast was devoid of

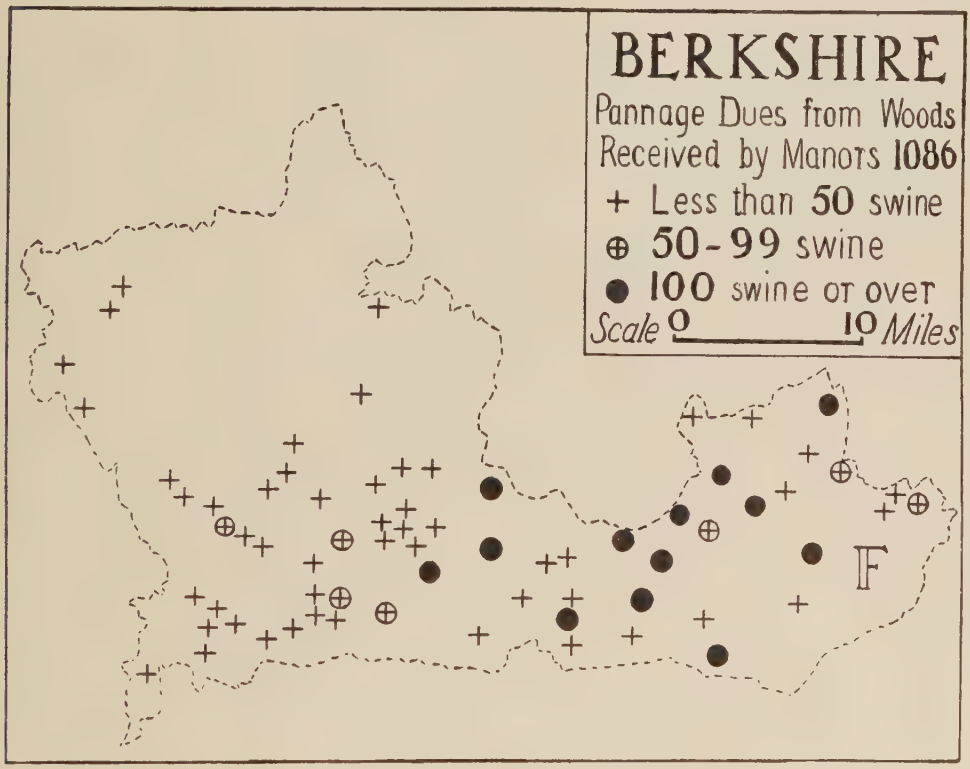

FIG. 3*

woodland. Farther west large tracts began and continued, irregularly, into Dorset. Several manors here had very large woods ; swineherds

[36] F. W. Morgan, ' The Domesday Geography of Berkshire ', *Scottish Geographical Magazine* (1935), LI, 353.

* Based upon fig. 3 (Pannage Dues), F. W. Morgan, ' The Domesday Geography of Berkshire ', *Scottish Geographical Magazine* (1935) LI, 357, by permission of the Acting Editor, Royal Scottish Geographical Society.

were specially mentioned on some. Here, too, were to be the royal forests of Bradon, Chippenham, Melksham and Selwood. To the northwest, the Oolite in Wiltshire carried little woodland, and, similarly, the great extent of the chalk to the east and south. Along the Berkshire and Hampshire borders, however, where the surface consists of Eocene beds and Clay-with-Flints, there were several well-wooded manors and a belt of forests later.[37] (FIG. 4).

The distribution in Dorset shows indications of some clearing. The Eocene beds gave rise to considerable woodland around Wimborne near the New Forest, but there were few entries for the southern part of this formation, which today is largely heath-land. The heavy clays to the north and west were by no means uniformly wooded and the Lias Clay in the extreme west was practically cleared. A certain amount lay on the Oolitic limestone. In Dorset, too, woodland entries were associated with the probable sites of four forests. (FIG. 5).

The relief and geology of Somerset are varied and can be related to several points of interest in its woodland distribution. In the extreme east was a belt of well-wooded manors on the Oxford Clay, in the neighbourhood of Selwood forest. On the wide outcrop of the Oolites some manors had extensive woods. Beyond was the broad belt of Lias Clays and here the distribution was most irregular. A considerable amount occurred around Bruton ; and in the south of the county between Langport and Ilminster there was a marked concentration, so much so that the rectangles formed by assuming the dimensions to be sides of rectangles overlap. Nearby, on the other hand, a large area of the clay around Ilchester was practically devoid of recorded woodland. There was a marked absence, too, immediately to the west of Bath, while on the Polden Hills, a long peninsula of Lias Clay amid the fenland, only one of the many villages there possessed any appreciable woodland. (FIG. 6).

The Mendip Hills had extensive woods on their lower slopes of Triassic Marls and Sandstones (and here were the later forests of Kingswood and Mendip). The area of the alluvial fenland (or ' moors ') in the centre was devoid of woodland, save for a little on the islands. In the west the Quantocks and Exmoor were well-wooded around their lower slopes, while the bleaker uplands were bare ; scattered woods in the Vale of Taunton and the Exe valley continued into Devonshire.

[37] F. W. Morgan, ' Woodland in Wiltshire at the time of the Domesday Book ', *Wilts. Arch. and N. H. Mag.* (1935), XLVII, 25.

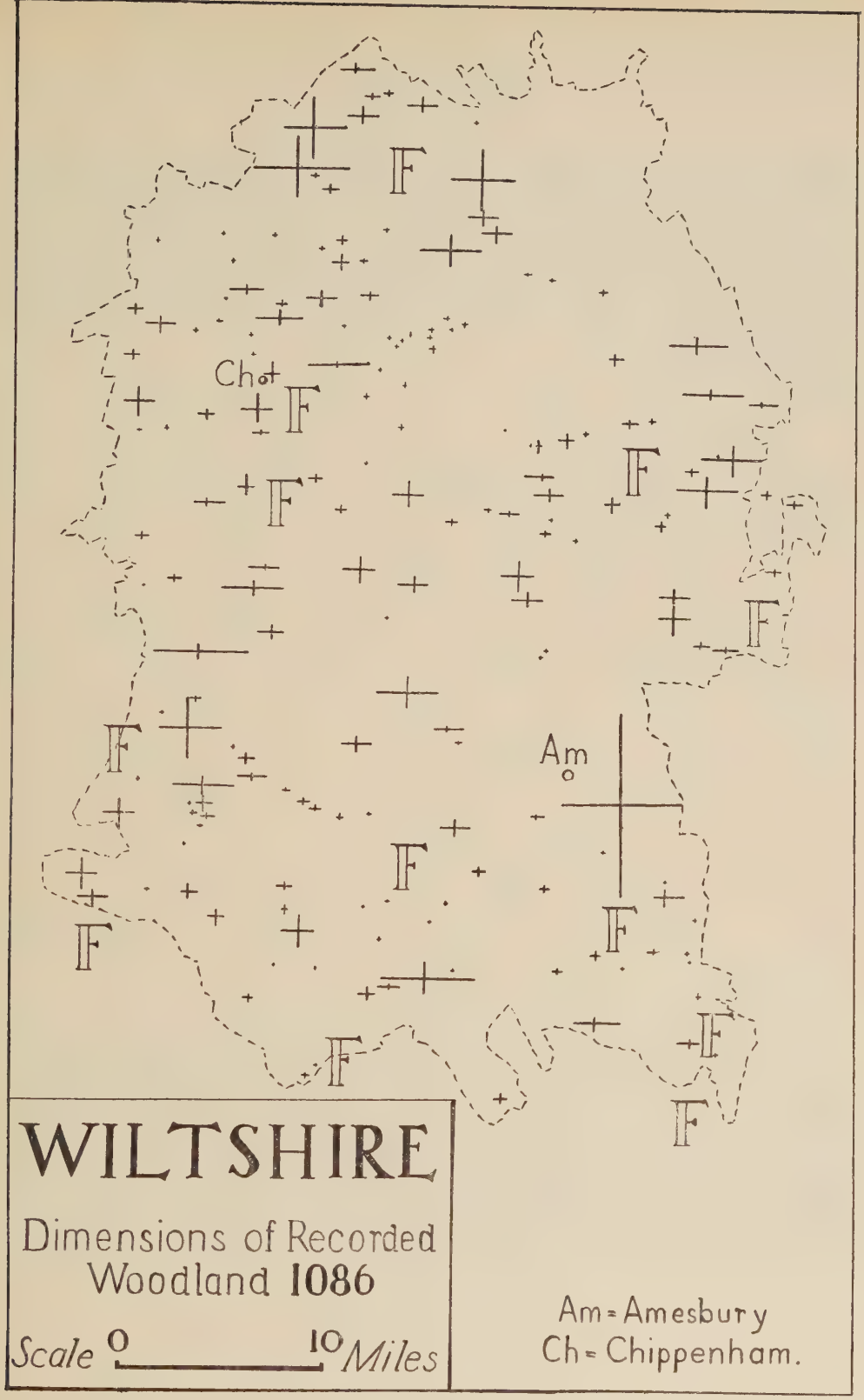
Ch
Am
WILTSHIRE
Dimensions of Recorded
Woodland 1086
Scale 0 10 Miles
Am = Amesbury
Ch = Chippenham.

Fig. 4

The older rocks of Devonshire (Permian Marls and Sandstones, Carboniferous Sandstones and Clays, and the Old Red Sandstone) were likely to have been favourable to tree growth, though perhaps not so favourable as the clays to the east. The great extent of these formations was reflected in the widespread distribution of Domesday

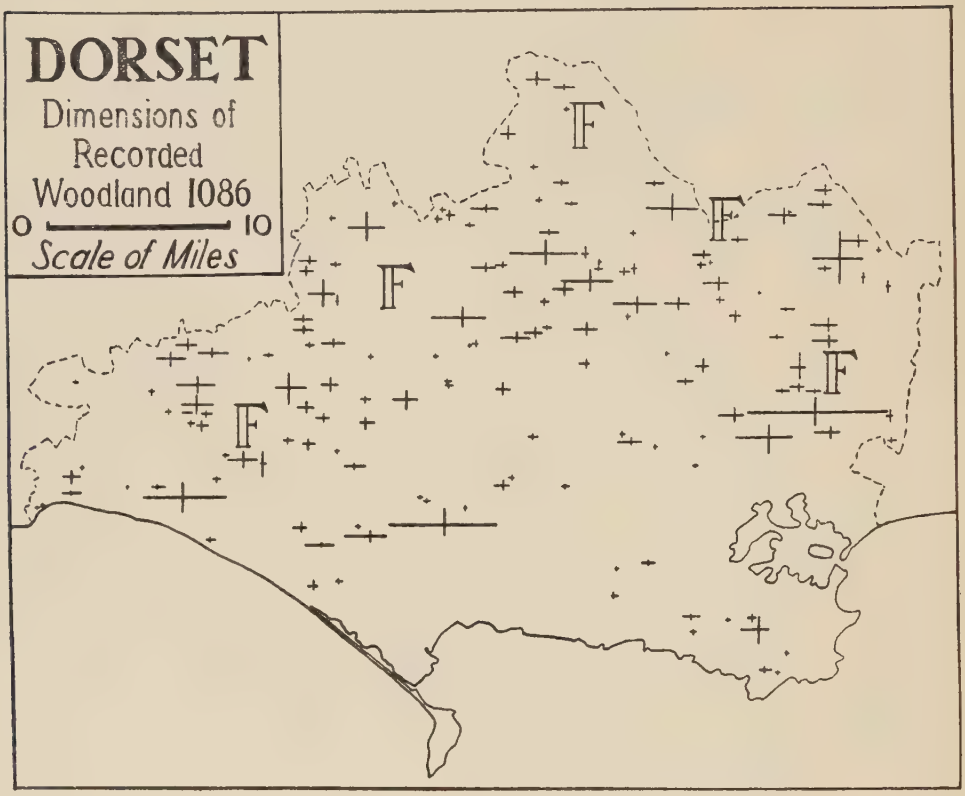

Fig. 5

woodland. Two areas only were sparse : to the north the exposed Exmoor plateau, and towards the south the granite massif of Dartmoor, where poor soil and exposure were again inimical to tree growth. The fact that in habitable regions there were no sparsely wooded tracts suggests that the woodland had been left widespread and that none had been cleared over large areas as in Berkshire, Wiltshire and Somerset. This fact may be related to the nature of the Saxon

colonization of Devonshire, which seems to have been ' a very gradual process, spread over all the centuries between the seventh and the eleventh, and indeed, continuing into medieval times '.[38] (FIG. 7).

In Cornwall the distribution was much more uneven. There was a marked concentration in the southeast in the lower Tamar valley, similar to that across the river in Devonshire. Apart from this there was little woodland in the lowlands which surround the wind-swept

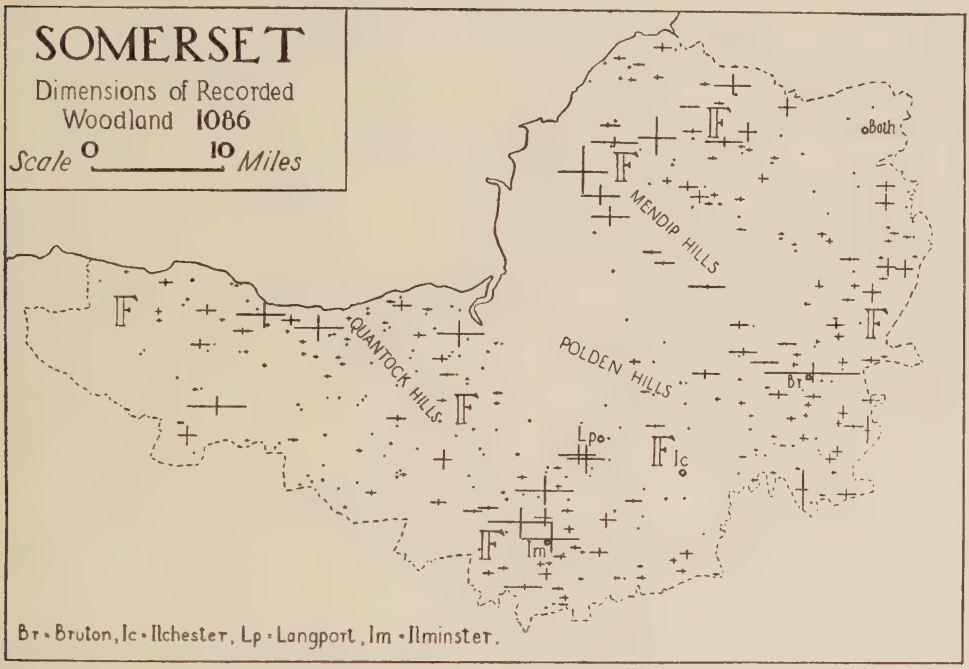

FIG. 6

granite moors, although conditions for tree growth do not appear to be particularly unfavourable.[39] The entries for Cornwall and

[38] J. E. B. Gover, A. Mawer, F. M. Stenton, *Place-Name Survey of Devonshire* (1931), xv.

[39] It is interesting to note that at the end of the eighteenth century a report of the Board of Agriculture stated that ' there is a good deal of coppice wood in the county of Cornwall, but little timber. Formerly the tin was smelted only with charcoal ; and this made them cut down their woods and keep them only in coppice . . . there is no doubt that timber will thrive as well in many parts of Cornwall as in other counties '. R. Fraser, *General View of the County of Cornwall* (Board of Agriculture, 1794), 59.

Devon in the Exon Domesday employ the term *nemus* to indicate wood, in contrast to the more general term *silva* of the Exchequer Domesday. It is difficult to see any significance in the distinction, however, and none

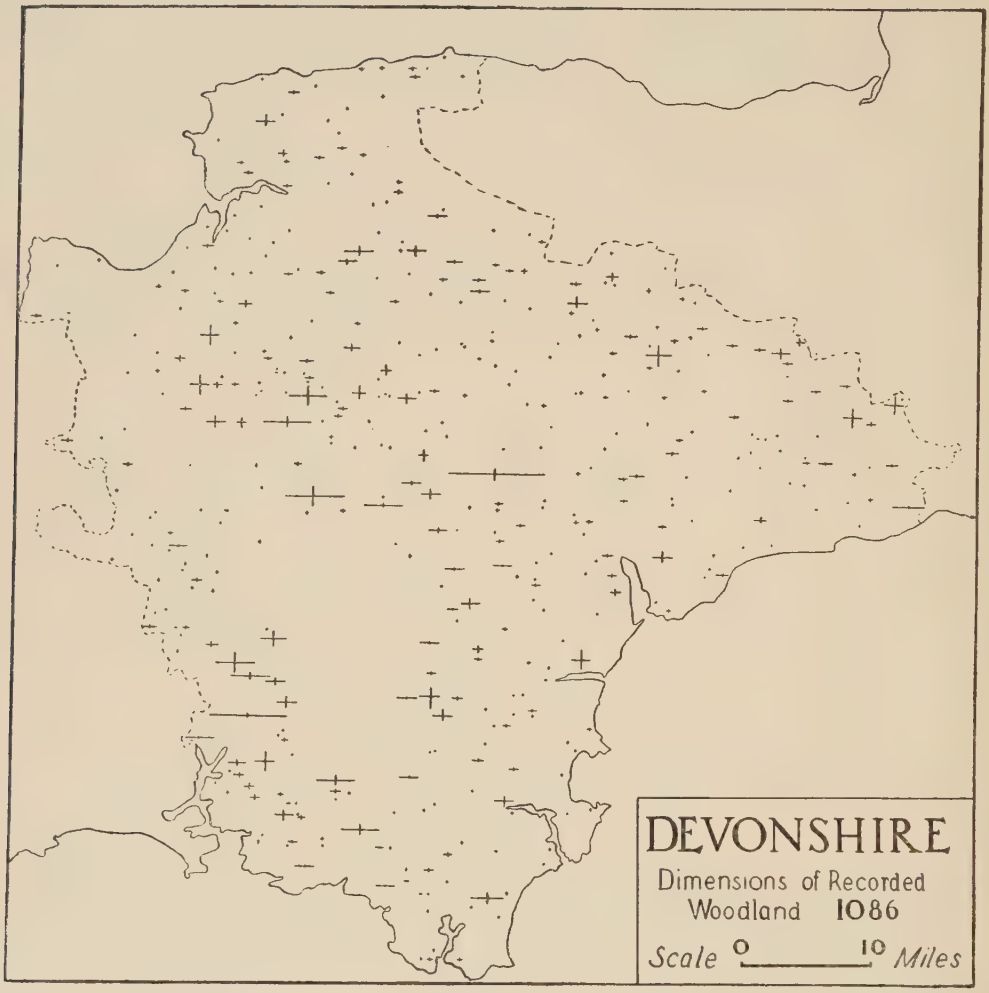

Fig. 7

was noted by Sir Henry Ellis.[40] The Exon version differed, too, in recording the numbers of animals, including swine, kept by the holder

[40] *General Introduction to Domesday Book* (1833), I, 100–101.

of each manor, but this information affords no check to the amount of woodland. In Cornwall it is true that ' the entries of stock show that the number of swine kept was small, very much below what is found in

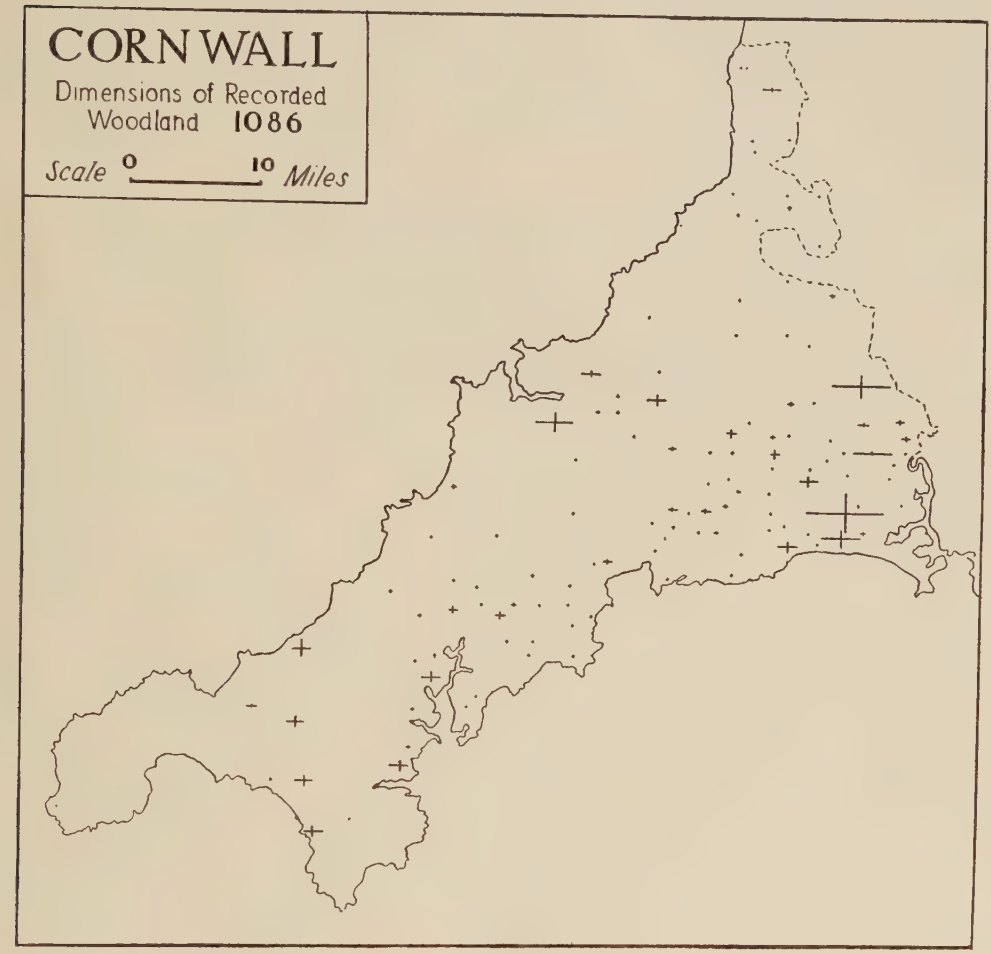

Fig. 8

many other counties ',[41] but this total can refer only to that of animals on the demesnes ; often a manor had a large wood, but the holder appears to have kept no swine. Thus at Cargoll in Newlyn, with

[41] L. F. Salzmann and others, *V.C.H.* : Cornwall Domesday (1924),56.

4 acres of wood, there were 7 swine,[42] but none are recorded for St. Germans, with woods 2 leagues × 1 league and 4 leagues × 2 leagues ;[43] at Blacktorington in Devon, with a wood 1 league × ½ league, the lord had 30 swine and there is mention of 10 swineherds there.[44] Occasionally, however, reference is made to swine other than those on the demesne : at Tawstock in Devon, with 20 acres of wood, the lord had 28, and 7 swineherds rendered 35[45]—that is, a pannage rent comparable with those so often associated with the manors of Berkshire and Hampshire. (FIG. 8).

In looking at these maps of Domesday woodland it must be remembered that many centuries had passed since the time of widespreading natural woods, and several centuries of Saxon occupation. With the growth of population the natural vegetation was affected by two forces, the grazing of animals and the requirements of the plough. The effect of pasturage in reducing the Chalk hills to their present mainly open condition was probably of much longer standing than the Saxon occupation. The pannaging of swine, however, was more characteristic of the Saxons ; there are references to it in pre-Conquest charters,[46] and its constant mention in the Domesday Survey shows that it was certainly a fundamental part of their economy. Sir Cyril Fox has made the important point that the practice of pannaging, over a long period, must have done much to prevent the natural regeneration of oak and beech woods.[47] But of greater ultimate effect, probably, was the spread of settlement, involving the destruction of woodland by axe and plough, in the way hinted at by King Alfred. In Berkshire it can be seen that the process of clearing was closely connected with economic activity, for the cleared area was one of greater economic importance than the rest of the county. In 1086 the Vales of White Horse and Thames in north Berkshire, consisting chiefly of heavy clays, were marked by closer settlement, greater density of population and agricultural activity, and higher values of land, than in the Chalk and Eocene areas to the south which had largely retained their woodland.[48]

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[42] D.B., III, 203. [43] *Ibid.* 199b, 200. [44] *Ibid.* 93b. [45] *Ibid.* 94b.

[46] *e.g.* Birch, Cartularium Saxonicum, no. 513 (A.D. 866): 'LXX porcis saginam in commone illa salvatica (silvatica ?) taxatione . . .'

[47] *op. cit.* 71.

[48] F. W. Morgan, *op. cit.* For examples of clearing in East Anglia see H. C. Darby, 'Domesday Woodland in East Anglia', ANTIQUITY (1934), XIV, 214.

FIG. 9. MAP SHOWING THE EXTENT OF THE ROYAL FORESTS ABOUT 1300, BASED UPON ORIGINAL SOURCES

These two factors must be the main causes of the many empty spaces in the distributions in comparison with the geological map.[49] Even if a part of the area for which no wood was recorded can be ascribed to the holding of woods by distant manors, much the greater part must be the result of the destruction of woodland. The Domesday maps register, in fact, an important stage in the transformation of the physical environment through the economic needs of the Saxon community.

Note by O. G. S. Crawford

The accompanying imperfect map of the Royal Forests of Wessex is based upon original research carried out, mostly before 1920, by O. G. S. Crawford. The extent of the area under Forest Law can be ascertained in each instance by identifying the boundmarks given in the Perambulations. Most of these are given in the Pat. 6A in the Public Record Office dated 1298–1300. Where the bounds have been identified by me they are shown by a firm line, where there is any doubt by a broken line ; when no attempt has been made to identify them the name of the Forest only appears. (The eastern part of the forest of Alice Holt and Woolmer should have been shown by a firm line, but was accidentally omitted. The Forest of Blackmore extended beyond the Stour towards that of Gillingham, with which doubtless it was once continuous).

It must not be concluded that the area within the Perambulations was necessarily all woodland. On the other hand it is fairly certain that large portions of some *were* covered with trees. Much of the area within the Perambulations was uninhabited, except for the Lodges where the Forest Officers lived and occasional purprestures, whose number increased after 1300.

[49] These spaces would be larger if a league of less than 12 furlongs be assumed.

The 'Crooked Field'

by F. G. Roe

THIS paper has nothing to do with the Celtic, Roman, or Teutonic origins of the ancient field-*systems* of cultivation. Even if those controversies had not been decisively settled by air-photography and its latter-day discoveries, I possess no special competence for the task. I am here concerned with the *form* of the plots or fields themselves in which these cultivation-systems were carried on. And we possess abundant evidence that what are classed by competent investigators as ancient 'Celtic-fields'—irrespective of whatever methods of cultivation or of crop-rotation prevailed within their borders—were quite frequently of the same irregular shapes as the later English fields; of which countless numbers may still be seen.[1]

I use the term 'crooked' for lack of a better; but in many—perhaps most—instances, it is not strictly accurate. The dividing hedges, or 'stane dykes' in northern England, for example, are quite commonly straight enough in themselves; but the fields they enclose are often neither rectangular at any one corner, nor of parallel sides; and even where such geometrical features are found, though it be only in part, the borders of the adjoining field may not continue on any one of the same alignments.[2]

It would in my view be entirely illogical to explain these utterly irregular forms on any supposition of a happy-go-lucky, higgledy-piggledy, devil-may-care attitude on the part of those who first marked out their borders. I share the opinion of Thorold Rogers concerning the English farm labourer of his day—the lineal descendant frequently, of the men who laid out those fields—as one of the most versatile skilled workers the world has ever seen;[3] an opinion held by

[1] See various plans and illustrations in Antiquity, I, 261–89, 456, 460, 463, 466, 469; IV, 80–95; VI, 389–406; VII, 296–97; IX, 472–73.

[2] Among many such, I have seen nothing better than the beautiful photographs of earthworks, etc., in Northern Ireland. *Ibid.* IV, 453–59 (Dec. 1930).

[3] *Economic Interpretation of History*, 7th ed., 1909, p. 20.

old William Harrison three centuries earlier.[4] But even if we do not concede this, we may remember that these ' crooked fields ' were planned for cultivation *by the plough*. Since ever ploughs bore any essential relation to the modern implement (which in England dates at least from Walter of Henley's time, 1250 ; doubtless from a much earlier date[5]), there has probably never been a ploughman who has not prayed for a ' square ' (*i.e.*, rectangular) field ; and the more unskilled or slovenly, the more reason he had to dread any acute geometrical forms in ' finishing his lands ', or worse still, perhaps, in laying them out. In any event, these early pioneers no sooner had another irregular field to go at, than they proceeded to mark it off in the rigidly parallelogram 'strip-forms'. I think we may fairly assume that such men would have had their fields also of equally uniform rectangular shape if they could.

This peculiar shapelessness appears to have been almost entirely overlooked by modern students, in so far as I have been able to discover, perhaps in the more exciting chase after system-origins. One or two earlier observers exercised themselves over the problem ; but I fear to little purpose. William Cobbett was an invaluable source of information on the England of his day, for he went about in all directions with his eyes open. He noted the phenomenon (doubtless among other localities) about Uphurstbourn, Hants. ; and had no hesitation in stating the reason, as follows :—' A considerable portion of the land is covered with wood ; and as, in the clearing of the land, the clearers followed the good soil without regard to shape of fields, the forms of the woods are of endless variety, which . . . makes this a very pleasant country '.[6]

While perhaps nobody at this date is competent to call such a thoroughly practical farmer and woodsman into question concerning a particular spot in 1822, it is beyond doubt that this explanation is entirely inadequate as a general solution of the problem. For it takes no account of the comparatively large tracts sub-divided by many of these ' crooked ' fields, which present every visible indication of being generally homogeneous in soil-content and quality over broad areas ; nor does it allow for the fact of so many of these boundaries being, as I have pointed out, straight enough in themselves from point to point.

[4] Harrison :—' I haue to saie of our husbandmen . . . that they were neuer so excellent in their trades as at this present . . .' *Description* (ed. F. J. Furnivall, New Shaksp. Soc. 3 vols. 1877), I, 136.

[5] See E. C. Curwen on this, ANTIQUITY, I, 268–72, 287.

[6] Cobbett, *Rural Rides* (Everyman ed.), I, 128.

It is needless to stress the argument that good or poor ' soil-frontiers ' do not follow any such straight lines.[7]

In the course of a discussion on this subject many years ago, another most interesting suggestion was advanced concerning the ' crooked boundaries of fields ':[8]

> These arise from three circumstances : first, the running of the water in the ditches, which, like all rivers, and all streams, work themselves a crooked course by indenting any soft place there may be in the bank, and flying off at an angle with increased impetus against the opposite side, much as a billiard ball does off a cushion, make a corresponding indentation a little farther on. The second cause is the growth of large trees on the banks ; the roots or ' toes ' of which project into the ditch for the sake of the moisture, and as the neighbours do not like to injure the timber, they cut the ditch close into the land between them, so as to make a sort of give-and-take line. The third cause, which accounts for the large curves often found in fences, is that they have followed the boundary or edge of some old pond or pool, since drained and filled up or levelled. On comparison with old maps I have known fences which were set out quite straight in allotments a hundred years ago, have now become considerably crooked. And only a short time ago, in making a survey, I found a river had changed its course and had become more crooked, to an extent of nearly double its width, since a map made in 1745.

Another contributor to the same discussion ascribed these curved boundaries to the practice on hill-sides of ploughing *along* the hill.[9] In answer to the latter argument it may be pointed out that even in cases of known hill-side ploughing for years beyond record, such as the famous ' lynches ' (linchets) at Clothall, Herts., this effect does not appear to have ensued, to the degree suggested.[10] In one case I have actually seen in Alberta, where an irregular-shaped knoll in the woods, sloping downward on all sides from the centre in convex form, was first broken and invariably afterwards ploughed by commencing

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[7] ' . . . land refuses to be cut into parallelograms, each of which is 40 rods long and 4 wide . . .' F. W. Maitland, *Domesday Book*, pp. 379, 380. Or—' each of which is good soil or bad '.

[8] *Notes and Queries*, 1859, Ser. 2, VIII, 440. Perhaps with some such consequence in mind, it was ordained at Coventry in 1421 :—' And that no man do make any hegge be viij foote nyghe the foresaid diche (the town ditch) within ne without be vj fotte, ne that no man dig ne lede thens any cley . . .' *Coventry Leet Book*, ed. Mary Dormer Harris, 1907–9, I, 30.

[9] *N. & Q.* Ser. 2, VII, 485.

[10] Sketch in Seebohm, *English Village Community*, p. 5 ; photo. reprod. in Cunningham, *Growth of English Industry and Commerce* (5th ed., 1910, frontispiece). In Seebohm's sketch the ' terracing ' is much steeper and more pronounced than in Cunningham's photo, by Miss E. M. Leonard ; but compare the scale-profile in E. C. Curwen, ANTIQUITY, I, 274. Vinogradoff notes linchets in Anglo-Saxon charters ; Kemble, *Cod. Dipl. ann.* 931, 938, 959 : (*English Society in the Eleventh Century*, p. 279).

around the outer edge and finishing in the centre—no such effect was produced on a softwood post-and-rail fence ; quite as easily moved, surely, as a deeply and strongly rooted hedge. The only visible result after twelve years' annual ploughing was the piling up of a great bank (' linchet ') around the outer edge ; then some eighteen inches high, and bidding fair, in due time, to overtop the fence itself.

But to whatever extent such explanations may command acceptance where the conditions of brooks or hill-sides may exist, it is obvious that they possess no value in level brookless localities. It may seem presumptuous, after emphasizing the limited applicability of every other suggestion I have met with, to advance one of my own with any hope of a general critical acceptance. I acknowledge that I should do so with much more diffidence were it not for two important circumstances. The first is that my hypothesis—as will be seen—is independent of any special local conditions, either of soils or of water-courses ; the second is that the process which I believe to be the true explanation of the ' crooked-field ' is one which I have not only seen in action in this Province, but in which I have myself participated. It is something which, owing to radical and fundamental changes in methods of clearing timbered land from those in vogue thirty or forty years ago, will never be seen again as a general practice. The ruinous methods of ' wheat-mining '—as distinguished from farming, properly so-called—demanded the immediate breaking-up of the largest area possible per year. Immense tracts of country in northern Alberta were quite heavily timbered ; and it came to be recognized that the rapid clearing of this was a business of its own, which required a capital investment in machinery and power, much of which was of no use to the farmer after this preliminary work was done, and in addition was often beyond his means. The outcome was that a class of men developed who cleared and broke this difficult land at a certain price per acre ; after which the farmer took over the cultivation proper. In Rome, one is frequently compelled by economic conditions to do as the Romans do ; it is a long time since I have seen the older methods in action, at all generally.

I do not know whether it is or is not generally realized that even the older-settled portions of Alberta, for more than two-thirds of the distance between Calgary and Edmonton and including a wide lateral belt, in north-central Alberta, were very far from being ' bald-headed prairie '. In many sections, our own Edmonton district, one of the very finest, being a case in point, the country, while not solidly timbered,

was—and to some extent still is—dotted with heavy clumps of wood and of willow scrub too large and heavy to be broken up at once without first grubbing out the roots as well as clearing the surface. The intervening spaces are sometimes so clear of either tree or shrub that they can be readily broken up and prepared for a crop with no other labour than ' cultivation of the soil ' in the strictest sense. Land of this character is commonly termed ' parkland '. In other instances, sometimes quite generally over a fairly large district—my own homestead was situated in one—these relatively ' open ' spaces are covered with a quite close and heavy growth of upland willow scrub, whose roots could generally be cut by a ' brush-breaker ' (a four-horse straight wooden-beam plough, sunk down about six or seven inches deep) ; sometimes without, but more commonly following upon the ' brushing off ', or burning, of the surface growth of scrub. This is commonly termed, according to the character of the growth, ' light scrub ', or ' scrubland '. The soil beneath is the very richest heavy black loam. The settlement of the Canadian West naturally followed the earliest lines of railway ; and as the Calgary and Edmonton Railway was built in 1890–91, this explains the taking up of this relatively difficult section of country, while huge tracts of open prairie land, as far east as the Manitoba boundary, were left untouched.

It almost goes without saying that the original settlers in this region, many of whom commenced with little beyond their hands,[11] having selected a homestead whose potentialities were either self-evident or perfectly clear to the critical expert, made it their first care, not commonly to select a site for the permanent home—this could come later—but to find the very easiest fertile spot on the place where their first five, ten, or twenty acres could be broken with the least preliminary labour ; sometimes to be cropped that same spring, with surprisingly good results in many cases, if the season were favourable ; but more often to lay over and be prepared for the following year.

It will at once be seen that in such a territory as I have described, it was not everybody who could ' turn the plough loose ' over the entire length of 160 rods, or even one-half, or one-quarter, of that distance. Woods and tall scrub do not, as I have remarked, confine themselves either to rectangular plots. In fact, from my observation in this—and probably such would generally be the case in England or anywhere else—the natural coppice or ' spinney ' apparently tends toward the circular form ; perhaps owing in part to the action of winds playing

[11] My own father and mother reached Red Deer with $10 : July, 1894.

around it, and possibly conveying a centripetal motion to falling seeds. In respect of larger woods, less amenable to such influences, I think anyone who has closely observed natural woodland areas—the English woodlands of today may not afford much opportunity for this—will agree that they are entirely erratic, and their borders wind in and out regardless of any relation to alignments. Under such conditions, and particularly in the ' parklands ' and among clumps or copses whose outlines are roughly circular or convex in form, it is obvious that for the ploughman to confine his plots to the strictly rectangular shape would involve a loss for years of much good land as easily broken up as any ; a loss not wholly compensated by the mere ' economy ', real or supposed, of square furrows for one implement alone, the plough. The various other modern implements, harrow, drill, binder, etc., can traverse curves just as easily as parallelograms ; and apart from some kind of harrow, they have no bearing in any case in considering the problem of early agriculture. The result is that we have our cultivated land winding in and out among the woods, exactly as Cobbett saw it in Hampshire, a century ago.[12] I may repeat that this is not conjecture ; I have myself seen and practised such methods. I suspect that the reason Cobbett did not see such processes for himself during his American visit (1817–1818)[13] would be that the Atlantic States were originally heavy and solid woodland, like eastern Canada ; where the first crops were grown among the stumps and ploughing was a very difficult and irregular operation until the stumps were extracted or had rotted away. There, it was just as easy to clear in rectangular plots ; and it is of course well known that this was the practice, ' blazing ' the trees[14] to mark the prescribed limit, like the ' hags ', ' hackways ', or ' hagways ', of medieval or later English forest practice.[15]

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[12] A deed cited by Maitland (Ely : *temp.* James I.) ' . . . the acre 4 poles in breadth . . . and by length as might happen by reasons of the configuration of the fen . . .' (*Domesday Book*, p. 383). See my FIG. 1, field E.

[13] Wm. Cobbett, *A Year's Residence in America* (*The Abbey Classics, c.* 1929).

[14] ' Blaze '=a white vertical gash on the trunk, visible from one such to the next ; the same sense as in a ' blaze-faced ' horse.

[15] ' Hag '=a section for a year's felling in a wood : thought by Thorold Rogers to be very old (*Agriculture and Prices*, I, 21). Found in Duffield Frith, Derbyshire, 1581 : Cox, *Royal Forests*, p. 198 ; *cf.* Forest of Dean, 1705 : J. Nisbet, *Eng. Hist. Rev.* XXI, 445–59. *Hagg* as a ' division ', in place or field-names at Selby, Yorks. : E. Bogg, *Forest of Elmet*, p. 236. Scotland, *c.* 1825 :—' working on a hag ', (an oak-felling and bark-peeling job) : R. M. Garnier, *British Peasantry*, pp. 321–8. Not to be confused with the Border ' moss-hags '.

It is also quite frequently found to be the case that one of these small or irregularly-shaped areas can be extended very materially long before it becomes necessary to attack the large timber in real earnest. Trees do not invariably stand thick and close upon the ground, like a solid wall, even in a ' wooded ' country ; and this is particularly true of the English oak, the typical tree of so many portions of England. I have seen many instances in the class of partly-wooded territory I have been describing, where the felling and stumping of perhaps a dozen trees,[16] dotted about in such a manner as to make it virtually impossible to strike out a straight ' land ', or one of more than a few furrows wide, would add several acres to a field already broken, or in contemplation. Similarly, a small clump, at the entrance, so to say, of a deeply-indented ' bay ' in the side of a great wood, or along the edge of one of the afore-mentioned copses or ' spinneys ', by its removal would enable a straight land to be struck out, perhaps for a long furrow. An amount of stumping or ' root-felling ' such as could be accomplished in two or three days—I again speak from personal experience—would sometimes suffice to change into an uninterrupted expanse of rectangular form as much land as a breaking-plough could turn over in as many weeks.

Quite as often, probably, as not, the outer borders of these new additions would neither be parallels nor at right angles to the original plot, assuming that to have been rectangular itself. In Alberta, the common method in the old rail-fence days was to fence as much as possible at once. If all the four quarters of a section (one square mile) were taken up, men were usually glad to fence one-half of their division lines, if their two neighbours wished to do the same. By this method, $1\frac{1}{2}$ miles, consisting of two half-miles on the outer sides and two quarter miles on the adjoining inner sides, fenced a settler's entire 160 acres ; whereas, failing this, it required a mile of fencing to enclose only 40 acres : (a square of 80×80 rods). Partition fences, dividing pasture-land, etc., came later ; and for many years, while plenty of open land and ' wild hay ' meadow (' slough ') remained, received but little attention. Many farms contained—many still contain—but one field, from one-half to one mile square, possibly even bigger sometimes ; with no other sub-dividing fences than those near the house and out-buildings.

Observe the visible consequences of this custom. In a ' parkland ' or scrub country, as each newly-broken piece of land was added to

[16] ' Ten-oaks field ', Bucks (1227, 1573 ; now ' Tinick ' ; *Bucks*, Eng. P.N. Soc. 1925, p. 10), may have been such an instance, when it was named.

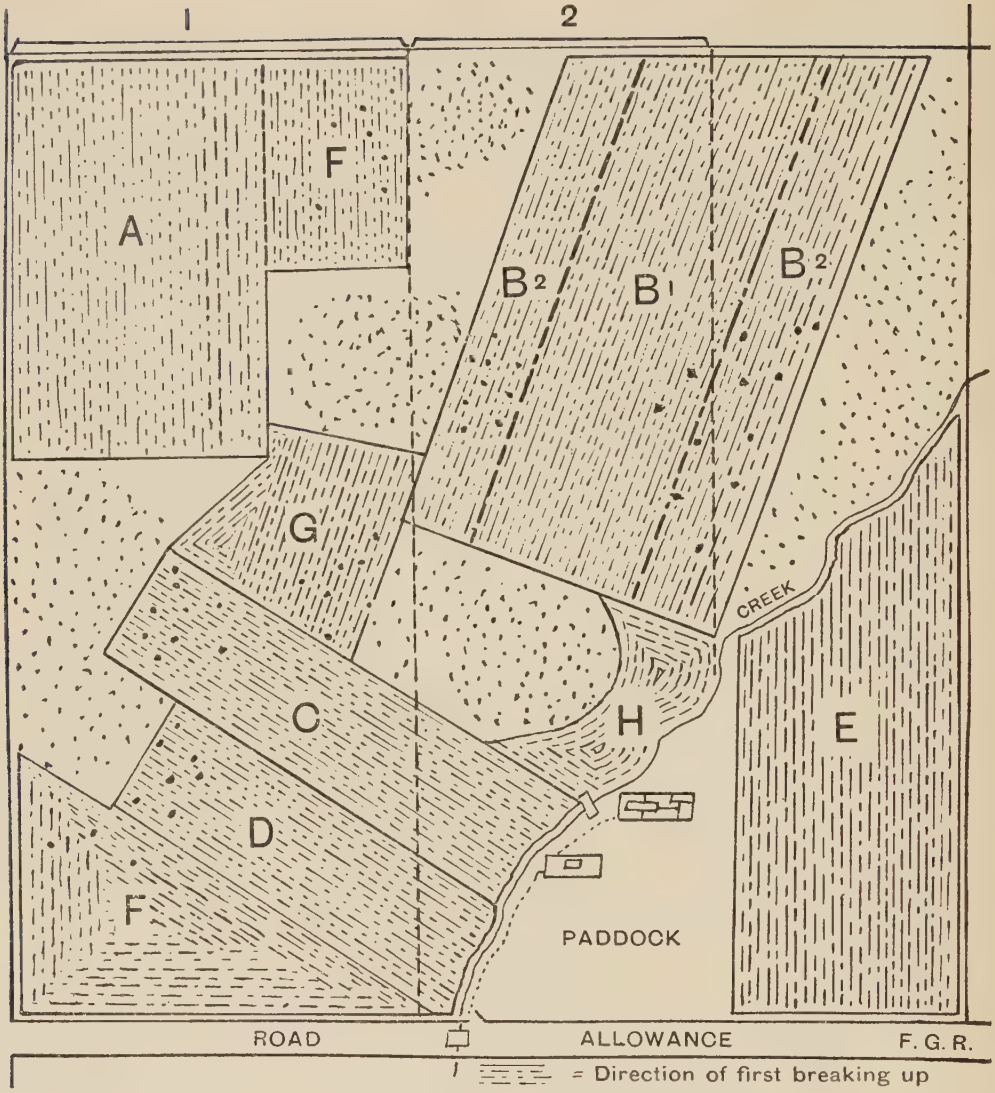

FIG. 1. ALBERTA ABOUT 1900

Scale of one half-mile square. (Total=160 acres: one 'quarter section').

A–H, Probable order in which such plots would be broken. Dots in the field spaces represent out-lying trees, cut to allow of rectangular field plots. Areas 1–2, probable order in clearing copses and breaking up.

It will of course be understood that the continuation of the irregular hedges or boundaries into the unploughed, tree-dotted waste does *not* suggest that these were marked off in this manner (by hedges) and cleared after. It is meant to suggest, so to say, how the next plot for clearing would suggest its own lines through the woodland 'sighting' between the trees.

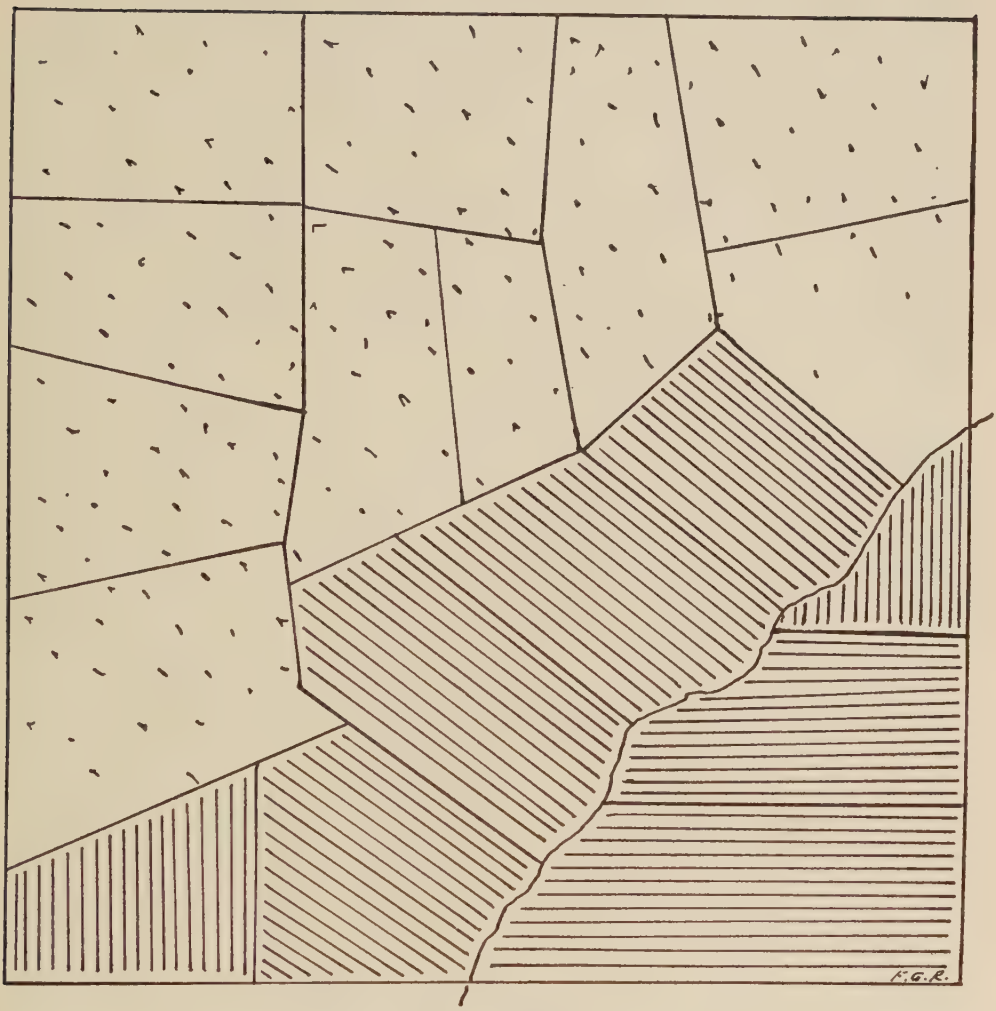

FIG. 2. ENGLAND

Scale of one half-mile square. (Total=160 acres: in 18 fields=averaging 8·9 acres per field).

The dots represent trees on the 'waste' prior to it being cleared for cultivation. They were marked *before* drawing the hypothetical dividing lines of hedge. Only one line touches a 'tree'; and could have avoided it. The different sizes of fields correspond to fact; and probably indicate the varying fortunes of the different years, war, famine, weather, pestilence, etc.; reflected in the amount brought under cultivation in such conditions.

the original plot, there would still be but ' one plot ' of cultivated land on the homestead, sometimes with the copses[17] standing out in the expanses like ' islands ' in a ' lake ' as shapeless as many lakes of water ; sometimes, as I have described it, consisting of a number of broadly rectangular plots or ' wings ', some at a true right angle to the line-fences or to previous breakings, and others not ;[18] perhaps so wide that the perspective would fail to reveal it to the eye. Whether so or not, the fact that the entire place, or a huge portion of it, was already fenced rendered the new fencing of each additional plot needless ; and here again, each year's new breaking, where it joined on to the common mass already under crop, making the field all one, would yield no indication to a new-comer how its component parts had come under the plough.

I have noticed several instances in recent years, on farms ranging from fifteen to twenty years of settlement, that having broken up all the available open land, in some cases they were attacking the small ' islands ' of copsewood, the trees being felled and the stumps torn out by a ' stumper ' before breaking. In other instances, small winding depressions or runlets, once considered too wet, difficult, and needless to break, and commonly bearing a heavy growth of trees or scrub, but now by the near proximity on both sides of well-cultivated land (ploughed closely in conformity with the ' configurations of the fen '),[19] practically drained through evaporation from its greater exposure to sun and wind and the increased receptivity of the slopes on either hand, were being broken up for cultivation. In all these cases, the traveller viewing these farms for the first time would see no cause to suspect that the plough was not originally driven across the place from end to end. The Editor of ANTIQUITY, or one of those experienced British airmen familiar with such investigations, might very possibly detect from the air the vestiges of the ' dead furrows ' in the earlier separate plots, lying at various points of the compass ; in contradistinction to the later

[17] See FIG. 1, field H. ' Island ' . . . ' is used of any piece of ground isolated from its surroundings . . .' A Mawer, *Chief Elements of Eng. Place-Names*, p. 38. ' Frencholm ', 12th cent. ' . . . a wood, surrounded by a ditch ' (the meaning being sought : *N. & Q.* Ser. 8, I, 247). Carlyle (no etymologist in English, though occasionally in German) describes (*Frederic*, VIII, 44), an open space in the woods as an ' island '. A similar place, ' Monmouth's Close ', New Forest, where he is said to have been taken in 1685, called ' The Island '. *N. & Q.*, Ser. I, I, p. 4. ' Holme Island ' (*i.e.*, ' island island ') : *Westmorland Gazette*, 5 May 1923.

[18] See FIG. 1.

[19] See FIG. 1, fields C, D, E, H.

ones pointing north and south.[20] The cults of the large field and the treeless farm, both of them potent economic forces in a land of short seasons, machine culture, and a terrific speeding-up at seeding and harvest time—despite the aesthetic censor's disapproval of the latter manifestation, and its dire consequences to soil and climate—have obliterated the ' history ' of the field, or are rapidly in the process of doing so.

Anyone possessing even the most superficial acquaintance with the elements of English manorial history is aware that the general development of English agriculture has followed very different lines. It is precisely this fact which has led to certain phases of that history being preserved (as I believe) in the English field itself, visibly proclaiming its origin to the inquirer. The Canadian homestead policy of settling upon each head of a family (or upon each adult male) a large tract of land as his freehold property, found its direct and complete antithesis in early English ' manorial custom '—to use the later phrase. One can scarcely doubt that the discouraging exclusiveness of the Anglo-Saxon village polity and its Saxon ' lord of the manor ' (to again anticipate) is in part responsible for the age-long rural English aversion to the ' foreigner ', who might have been a better *Englishman* (Angle) than his critics.

The very probable general *physical* history of the ' improvement ' of an English manor is not hard to reconstruct. Into this particular phase, that fruitful source of contention, the exact conditions under which they ' took over ' their future homesteads, scarcely need enter. Doubtless the earliest English settlers in almost any district both occupied deserted British homesteads and squatted on the virgin waste. It is of course a well-established fact that while the Celts in general were a hill-folk, either temperamentally or from the necessities arising from inferior tools not well-adapted to the clearing of heavy woodlands, the Saxons were a valley and forest folk, who preferred such situations.[21] This involves certain implications. If the original Saxon field was more probably a 'clearing' than the Celtic fields, other factors must not be forgotten. It has been seen that the ' crooked field ' by no means necessitates a prior condition of solid close-standing timber. Both the early history of English high lands like the Chilterns or the Downs and

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[20] See FIG. 1, at large.

[21] See E. C. Curwen, ANTIQUITY, I, 261–89, particularly, p. 278; O. G. S. Crawford, ' Our Debt to Rome ' : *Ibid.* II, 173–88.

the analogy of their modern vegetation, tend to indicate that those regions were not absolutely, but only relatively, bare of wood. If—as would seem to follow—the English invaders would eschew such locations until their more congenial valley and forest lands began to be filled up, during this rather lengthy interval such Celtic homestead regions in their (presumably) neglected condition would probably run back in large measure to wood ;[22] as other English districts did under such conditions.[23] This would produce the precise *desiderata*, for the ' crooked field ', of woodland rather than of solid timber.

In either case, their ' first crop ' would almost certainly require a hedge or fence of some description to protect it, lest it be found that ' the boar out of the wood doth waste it, and the wild beast of the field doth devour it '.[24] Similarly, as the growth of the village might

[22] In France, 1388, an ordinance states that ' hedges and brambles have greatly encroached on the roads, that there are even some in the midst of which trees have shot up ' : Jusserand, *Wayfaring Life*, p. 85. The Hebrew writer knew what follows war : ' . . . all the land shall become briars and thorns ': *Isaiah*, VII, 24; *cf.* Lorraine, 1728 : Carlyle, *Frederic*, II, 180.

[23] *Cf.* Medehamstead (Peterboro) in 852 ; burnt by the Danes, 870 ; in 963, ' nothing there but old walls and wild woods ' : *A. S. Chronicle*, *sub ann.* That is the Fens ; on 27 July 1929, near Naseby, the watershed of England, in the two years or so since the last trimming, I found growing between the road-macadam and the hedge, a thicket containing almost every English tree. Imagine ninety years of it ! See also a similar ' reversion to nature ' in a recognized ' Celtic-field ' area, Cranborne Chase ; O. G. S. Crawford, ANTIQUITY, II, 174, 186. Geology may delimit the occupational areas of any one tree ; is there any soil in England in which *no* tree will grow ? I doubt it.

[24] Psalms, LXXX, 13 (*cf. ibid.* LXXX, 12 ; LXXXIX, 40, etc.). It is not improbable, in woodland regions, that the first fence around a new piece would be of the nature of an *abattis*, felled in ' windrow ' when marking off their new field or ' hagg ', like the ' brush fence ' or ' slash fence ' of Ontario and other woodland regions. It seems fairly certain, from the shape of the old fields, that very seldom would more than two sides of a new plot need fencing at once, as the adjoining plots would constitute the other sides ; and the timber tops and brush would probably furnish sufficient for such a purpose from the clearing of the same year. The permanent hedge could be planted inside this, and grow awhile under its protection. The term ' quickset ' (hedge) points to a distinction between the transplanting of live bushes or slips (' setting quick ' ; as in the Catechism—' the quick and the dead ') ; and the mere piling up of dead thorns or underbrush. Hunter quotes a deed which (if his interpretation be correct) carries back what must have been live hedges to an early period, in Hallamshire, between ' S(h)efeld and Eglesfeld ', 1161 ; ' *sicut sepes antiquitus ante combustionem fuerunt* (" as the hedges anciently were before the burning ")' ; thought by Hunter to refer to William's harrying of the North, in 1069–1070 (Hunter's *Hallamshire*, orig. ed. 1819, p. 20 ; *cf.* Eastwood, *Hist. of Ecclesfield*, 1862, pp. 81–83). Probably old then ; and certainly no mere *abattis*, which could not possibly (after burning) remain as a (legally) recognizable landmark for anything like a period of ninety years. [*continued on next page*

necessitate other common fields being added to the number, these also must be fenced for similar reasons. We may be perfectly certain that in a land swarming with deer and wild swine, ' long ' or ' strategic ' views of fencing on a larger scale ' next year ', or anything of the kind, would be impracticable. And there are fairly clear reasons why the lord would not care to follow the reverse policy of fencing a large tract beforehand, and breaking it up gradually year by year, as our Alberta settlers have commonly done. For he no doubt hoped that each successive addition to the common fields would be the last in his time ; since each ' intaking ' from the manorial waste or ' the lord's outwoods ' very materially decreased the area over which he exercised vastly preponderating rights, and enlarged that wherein the common rights of the villagers were more nearly equal with his own. In addition to these potent considerations, it must not be forgotten that much of the heavy work of bringing these new additions to the manorial common fields under cultivation would fall upon the villagers in the summer, on top of the regular routine of field labours already devolving upon them. This fact has always laid a heavy strain upon the Alberta homesteader in the scrublands ; especially the poorer man who was unable at first either to fence his entire place or a large portion equivalent to several years' breaking. Rails and posts could be got out during the winter, and in winters of light snow-fall, land might be ' brushed '. But it can only be stumped, broken, or fenced (with posts) in summer. This would quite probably apply to England also, in so far a first breaking

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Prof. E. C. K. Gonner notes a method (recommended by Tusser and his editor) of making what a prairie farmer would call a ' windbreak ' rather than a hedge. The common English hedgerow is no ' rod or much more in width ' : *Common Land and Inclosure*, 1912, pp. 30–31

' The high banks in the extreme west and elsewhere (in England) have been interpreted by some as the necessary means of protection adopted when land was directly enclosed from a wild state and required defence against the depredations by wild animals . . . . ' *Ibid.* p. 100.

Dr G. G. Coulton cites one of the Berkeleys (Thomas III, 1326–61) ' whereas the part fence had hitherto been of thorn, new-made every three years, Lord Thomas went to the expense of an oaken paling '. . . . (Coulton, *Chaucer and his England*, 1908, p. 198). It seems incredible that this could have been quickset, unless it was a new one needing much cutting back, and the oak paling was to protect the defenceless park while it was growing. Possibly only an *abattis*.

The correspondent of *N. & Q.* (Ser. 2, VII, 373) who initiated the discussion, recognized this progressive reclamation of the waste, and almost had his finger on what I have suggested as the explanation.

and perhaps hedge-planting are concerned. In addition to such factors, there were the exigencies of medieval warfare ; this was almost always a summer-time occupation, and must have often interrupted agriculture.[25] Pestilence also no doubt frequently reduced the hoped-for results of a season's clearing.

There can, I think, be little reasonable doubt that the smaller of the ' crooked fields ', about the general average of ten acres or so, really do represent one season's ' reclamation of the waste '. The suggestions advanced in the foregoing pages offer abundant reason both for the small (and varying) sizes and for the irregular shapes. The characteristic form of the English oak—the commonest tree—makes it clear to anyone who ever saw one why the felling of even *one* such tree could enlarge an available area for the plough very materially.[26] Such reasoning could also apply to the free tenant or yeoman of somewhat later times, perhaps in some cases with even greater force ; for he would be more of a self-contained unit, like our homesteader, dependent upon the labour resources of his own household. Even if the economic and physical forces pressing upon him did not very largely point—in the pre-machine age—to the same general solutions of his problems, the innate conservatism of the English mind would no doubt lead such a man to do very much as his fathers had done. The same impulse would lead, did lead, the later hedge-planter of Georgian enclosure days to perpetuate the small and shapeless fields, long after the physical causes originating them had ceased to operate.[27] Even allowing for the fact (often overlooked) that what seem today to be their most glaring and self-evident

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[25] *Cf.* Maitland—' . . . readers of the *English Chronicle* will doubt whether there is any village in England that has not been once, or more than once, a deserted village '. *Domesday Book*, p. 364.

[26] See the photo of the ' Haywood Oak ', Blidworth, Sherwood : J. C. Cox, *Royal Forests*, p. 220. The ' brood oak ' or ' brod ooke ' which gave its name to Bradock or ' Brodewok-waste ' in Coventry, 1410, 1423, etc. (*Coventry Leet Book*, I, 18, 46 ; II, 439, 440 ; *cf.* 1498 : *ibid.* III, 588). *Cf.* Hunter on enormous oaks : one in Sheffield Park, branches 45 feet each way from the trunk, capable of sheltering 200 horsemen. ' Greendale Oak ', Welbeck, 33 feet girth ; the ' Lord's Oak ', Rivelin Park, 36 feet girth; top and branches (1690) yielded 21 cords of wood (8 ft.×4 ft.×4 ft.=128 cubic feet), *Hallamshire*, p. 116. *Cf.* ' Hatfield Broad Oak ', Essex.

[27] A list of 71 ' furlongs ' (field-names) into which the open arable fields of the parish of Whitchurch, near Stratford-on-Avon, ' had been divided, prior to the inclosure of 1867, from time immemorial ' : T. Smith Woolley (the surveyor) : *Notes and Queries*, Ser. 5, VIII, 192–3. *Cf.* the often early dates of field-names in the *Eng. Place-Name Soc.* volumes.

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defects had no significance in days less than fifty years ago, when the binder was unknown, and the scythe of the mower or the sickle of the reaper could work without waste or difficulty in any corner, I shall never believe that such shapeless agglomerations would have been laid out by expert practical ploughmen, for example ; commencing *de novo*, untrammelled by previous associations of any description.

A most interesting corroboration of my opinions (discovered, I may be permitted to add, many years after these had first been tentatively formed) is furnished by William Marshall, a well-known agricultural writer, *c.* 1800. Marshall frequently refers to ' inclosure from the wild ' (*i.e.* virgin ' waste ' ; as distinguished from inclosure of land previously cultivated as ' open common fields ') ; and believed it could be distinguished in various parts of England by ' fields and inclosures of irregular shapes and their fences crooked . . . ' ; also ' crooked fences and winding narrow lanes. . . .'[28] Professor Gonner also indicates some of these localities by counties ;[29] and his table further serves to show a considerable amount of ' wild ' country—in this sense—remaining down to comparatively late times. It may be remarked in passing that Marshall puts his finger on the very thing I had previously noted as the weak spot in the ' water-course ' theory of the crooked boundary ; that it took no account of such in places where no watercourse existed. In the pre-Macadam days, the road was the one place (like our Alberta trails before the use of the hideous ' road-allowance ' was forced upon us by closer settlement) which must be and was as ' high-and-dry ' as circumstances would permit. Yet the (contour) ' winding road ' necessarily involves the winding fence or hedge ; and is the precise spot whence the stranger's attention is first attracted to the phenomenon. Professor Gonner's inquiry did not require him to explain the distinction ; but one could wish that Marshall, who was an expert observer, in touch, moreover, with much lost or inaccessible ancient tradition, had lent a little light on such fields as I have described in regions where the common field system *did* formerly exist in a high

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J. M. Kemble, *c.* 1850 :—' Since the happy down-fall of the corn-laws, which were a bonus upon bad husbandry, hedges are being rooted up in every quarter, and fields of 40 or 50 acres may now be seen, where they were not thought of a few years ago. . . .' *Saxons in England* (2 vols. ed. Birch, London, 1876), I, 100.

[28] Gonner, *Common Land and Inclosure*, pp. 82–83, 284 ; also R. M. Garnier, *English Landed Interest*, I, 104.

[29] Gonner, *op. cit.*, p. 285.

percentage ; and just what difference the ultimate purpose for which a field was destined should make in the configuration of its boundaries.[30] *A priori*, one might suppose that the field whose transfiguration from its native wildness was of later date would be the more geometrical of the two ; unless, indeed its winding boundaries had, as I said, been already fixed by the winding roads. I may add that it was from observations in Northamptonshire in 1913, a county whose percentage of ' common field enclosure ' stands among the highest,[31] that I was first led to my present conclusions.

[30] Some rather meagre information on this in Gonner, *op. cit.* pp. 82–3. ' As late as the beginning of this (twentieth) century there were districts whose hedges still showed traces of the pastoral or forest state, being apparently of great age, following crooked or irregular lines, and composed of underwood similar in variety to that in the adjoining woodlands, from which they had evidently been collected. . .' Garnier, *English Landed Interest*, I, 104. Apparently Marshall's ' old coppice hedges, of age beyond memory ' (in Gonner, *op. cit.*, p. 83).

J. M. Kemble :—' It is very remarkable how many modern parishes may be perambulated with no other direction than the boundaries found in the *Codex Diplomaticus* (*Ævi Saxonici* ; ed. Kemble, 5 vols.). ' To this very day the little hills, brooks, even meadows and small farms, bear the names they bore before the time of Ælfred, and the Mark may be traced with certainty upon the local information of the labourer on the modern estate. . .' (*Saxons in England*, I, 246). *Cf.* O. G. S. Crawford, ANTIQUITY, II, 179–80. This fact is the foundation of modern place-name study, as the annual volumes of the English Place-Name Society bear witness.

[31] Gonner, *Common Land*, pp. 255–8 ; and *cf.* his various tables and maps (pp. 448–57).

Evolution of the Clinker-built Fishing Lugger

by James Hornell

ON a recent visit to Rye I had an opportunity to see what is now becoming of rare occurrence in England—the construction of a large fishing lugger on the clinker system of overlapping the upper edge of each plank or strake in the sides by the lower edge of the one above, the two being riveted together at short intervals.

Viewing the boat from a point on the quarter as I entered the shed, it seemed that time had rolled back and that I was looking into the bare hull of a Viking boat ! It might well have been a sister ship to that of Gokstad that I saw in the making. The resemblance was increased by the illusive appearance of height possessed by the stem and stern posts, for as yet only the lower part of the hull planking was in place.

The builder explained that he lays down the keel and sets up the stem and stern posts in the ordinary way ; thereafter he bends and fits the strakes in position and rivets them together, entirely without the support of any kind of internal framework.

When I first saw the boat, the planking of the bottom was complete and that of the sides to a point just above the turn of the bilge. The upper ends of the stem and stern posts were stayed on each side by a strong batten running to one of the tie-beams in the roof frame above. A different method was employed to hold the keel in place. A stout timber had been nailed transverse to a number of the tie-beams overhead ; the keel was laid immediately under and parallel to it. When keel and end-posts had been adjusted in position, three stout props were then inserted vertically between the keel and the timber above and wedged tight. One was placed amidships ; each of the others midway between the first and one of the ends.

The next step is to fit and rivet the strakes forming the rather wide bottom. Neither plans nor moulds are made by Sussex boat builders apart from a half-mould used amidships as a guide to curves and to the distances from the axial line at which the strakes are to be adjusted.

Apart from this guide which is changed from side to side as necessary, the curves of the strakes are fitted by eye alone. After riveting, the principal strakes are held in place and in proper curve temporarily by a number of battens fixed between critical points on the strakes and appropriate points on the beams overhead or on the side of one of the keel props.

The time when the frames are inserted is subject to variation. Some builders used to fit and rivet all the strakes before framing. Others would fit the floor timbers as soon as the turn of the bilge was reached (the plan seen in operation) but even these postpone fitting the ribs until the whole of the skin planking is assembled.

In both instances the type of framing is definitely of the inserted order ; it is therefore the direct converse of the carvel type of boat construction where a skeleton of the future boat is first made by building up a complete framework of timbers on which the skin planking is subsequently nailed or bolted. A second distinction is that in a carvel-built boat the strakes are joined edge to edge, forming a seam that has to be caulked afterwards to make it water-tight.

It is a fact of great significance that all boats in the Mediterranean Sea and the Indian Ocean are carvel-built, whereas the clinker-build is found native only in North European seas, with its centre in Scandinavia. The very earliest remains of a clinker-built boat, that of Als in Denmark, date from a time when Bronze Age culture was slowly developing into that of the Iron Age—probably between 500 and 400 B.C. in the case of the Scandinavian tribes. Next in time are the fragments from Halsnö in Norway, now in the Bergen museum ; their exact age is uncertain but it is probably considerably earlier than the third century A.D., because the plank fastenings are of fibrous material, whereas metal rivets are present in the Nydam boat which is known to date from the century named.

In later centuries the Vikings remained faithful to the clinker-build for the ships used in their raiding and exploring expeditions. They also adhered to the use of inserted frames like their predecessors.

In all the instances cited and as continued in the Sussex and Kentish fishing luggers of today, evolutionary development is apparent in two directions, namely :—(*a*) in reduction in the width of the planks forming the skin, and (*b*) in the method of inserting the frames.

As described elsewhere[1], in all of these except the modern type, the

[1] ' Constructional Parallels in Scandinavian and Oceanic Boat Construction ', *The Mariner's Mirror*, vol. XXI, October 1935.

planks are tied to the frames by means of lashing passed through perforated lugs or comb-cleats left upstanding on the inner side of the various strakes. Apart from actual measurements, the relative width of the planks in the boats of different ages is shown by the number of cleats or lugs in each transverse series upon each plank.

In the Als boat, the garboard strake and the keel or bottom board have five cleats in each series, with three on the upper side strakes. The Halsnö fragments are too incomplete to allow us to say how many cleats the lower strakes had in each series but one fragment had two in its breadth. Two cleats are also characteristic of the Nydam boat, while in the Gokstad and other later Viking ships, a single cleat is all that could be accommodated in the breadth, so narrow had the strakes become. In modern clinker-types, cleats have disappeared ; the planks are now through nailed directly to the frames and clenched.

In the Als, Halsnö and Nydam boats the ribs and floor timbers rested flat against the summits of the lug-shaped cleats. In the Gokstad, Oseberg and other Viking ships whereof remains survive, the frames had notches cut at intervals on the lower side in order to fit over the tops of the cleats and so cause the frames to lie closer to the skin-planking ; actually the upper and inner edge of each strake was in contact with the frame. In the Sussex boats the floor timbers and sometimes the ribs are shaped to fit the angular surface of the clinker-built skin and are riveted thereto.

Subsequent to the Viking Age, the saw gained ground as against the adze and this appears to have entailed the abandonment of the cleat-attachment system in northern boat-building. By the use of a saw, planks of any required thickness can be obtained far more quickly as compared with an adze. Sawing is also a much more economical method, for where an adze will usually dub out only a single plank from half of a split tree trunk, a saw will supply several. But a saw cannot leave upstanding lugs and this, we may conclude, was the determining factor which brought about the abandonment of cleat attachment.

In the English clinker-built luggers and their near relatives in Scandinavia, the essentials of old Viking boat-building methods still persist. The design of the modern boats constitutes the last phase of a series that was already in existence on the Scandinavian coast 2500 years ago. No series could be more complete and more indicative of the autochthonous origin of the clinker-build system still favoured by the fisherfolk of northern Europe.

If it be conceded that modern clinker-built boats are in direct

descent from the Als boat-type, this brings us to the problem of how arose the clinker-build characteristic of the whole series. An origin from a raft with built-up sides has been suggested. This may conceivably be the answer so far as Egyptian vessels are concerned, and possibly for the ancient Mediterranean type from which the carvel design has been evolved. But it is quite unacceptable for boats of northern origin. Rafts may be and are widely used in tropic seas, for semi-naked men can there endure continuous soaking for days together as waves wash through their low-lying craft. In the bleak North seas, the exposure entailed by raft-voyaging is usually fatal within a

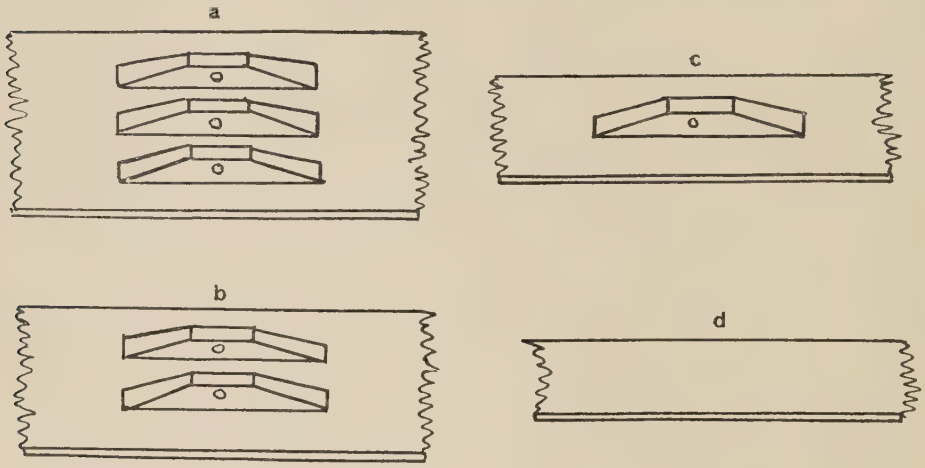


DIAGRAM SHOWING THE PROGRESSIVE REDUCTION IN THE NUMBER OF RIB-CLEATS IN CLINKER-BUILT BOATS

(*a*) Als boat, top strake, 3 cleats.
(*b*) Halsnö and Nydam boats, 2 cleats.
(*c*) Gokstad boat, 1 cleat.
(*d*) Sussex lugger, no cleats.

few hours to all but the most hardy except during the short period of warm weather in the height of summer. Hence raft-voyaging has never been practised in the North and we cannot look to the raft as the origin of the clinker-built boat. The source is, in consequence, narrowed down to the dug-out canoe. Here, when need arises for a roomier craft, it is still usual in many localities to add a plank—a wash-strake or a weather-board—to the gunwale of the dug-out. In Oceania this is done by sewing on the added board, carvel-fashion, edge to edge, upon the original gunwale and by closing in the two extremities of the canoe. In Scandinavia, instead of so doing, the Bronze Age people,

PLATE I

GOKSTAD SHIP: VIEW LOOKING FORWARD
By courtesy of the Universitetets Oldsaksamling, Oslo

facing p. 344

PLATE II

A SUSSEX FISHING LUGGER UNDER CONSTRUCTION, RYE, 1936

The floor timbers were put in *after* the skin planking had been put together up to the turn of the bilge. The two massive timbers in the foreground are the engine bearers, and would not be present in a sailing lugger.

who lived in colder and stormier seas, appear to have found it preferable as being stronger, to overlap the edges and sew them together in this position—the genesis of the clinker-build.

These early boats, formed by excavating the trunk of a tree, were necessarily rounded in the bottom, without keel. As size increased and longer voyages were embarked upon, the dug-out region, the underbody of the craft, shrank in width concurrently with increase in the number of strakes in the sides. In the Als boat the dug-out had shrunk to a broad plank, with two strakes forming each side ; in the Nydam boat the keel plank is still narrower and on the under side a broad, low projection has developed, while the side planks have increased to five. Then in the Gokstad, Oseberg and all subsequent boats the basal plank is transformed into a true keel, narrow and markedly salient, with very narrow side-strakes.

From the foregoing facts the inference emerges that modern European vessels are not monogenetic. At least two independent origins must be postulated and, as I have mentioned, the probability is that certain of the carvel-built type are derived from the raft—either the papyrus raft of Ancient Egypt or the log-catamaran of South India. Conversely the clinker type is the offspring of the dug-out canoe, born in the forests of the North where trunks of huge size were once abundant.

Finally I have to point out that the distinction between (*a*) boats in which the skin planking is nailed upon a pre-assembled framework, and (*b*) those where the frames are inserted after the shell has been put together is a consideration of fundamental importance in the study of boat origins and evolution. Unfortunately it is comparatively rare to find details on record of the characteristics distinguishing the methods of construction of local types. An instance in point is the ignorance that prevailed until recently of how the framework of Welsh coracles is put together in different localities.[2] By neglect of investigation in this direction, valuable indications of origin and descent may be lost.

[2] See Hornell on ' British Coracles ', in *The Mariner's Mirror* for January and July 1936.

Notes and News

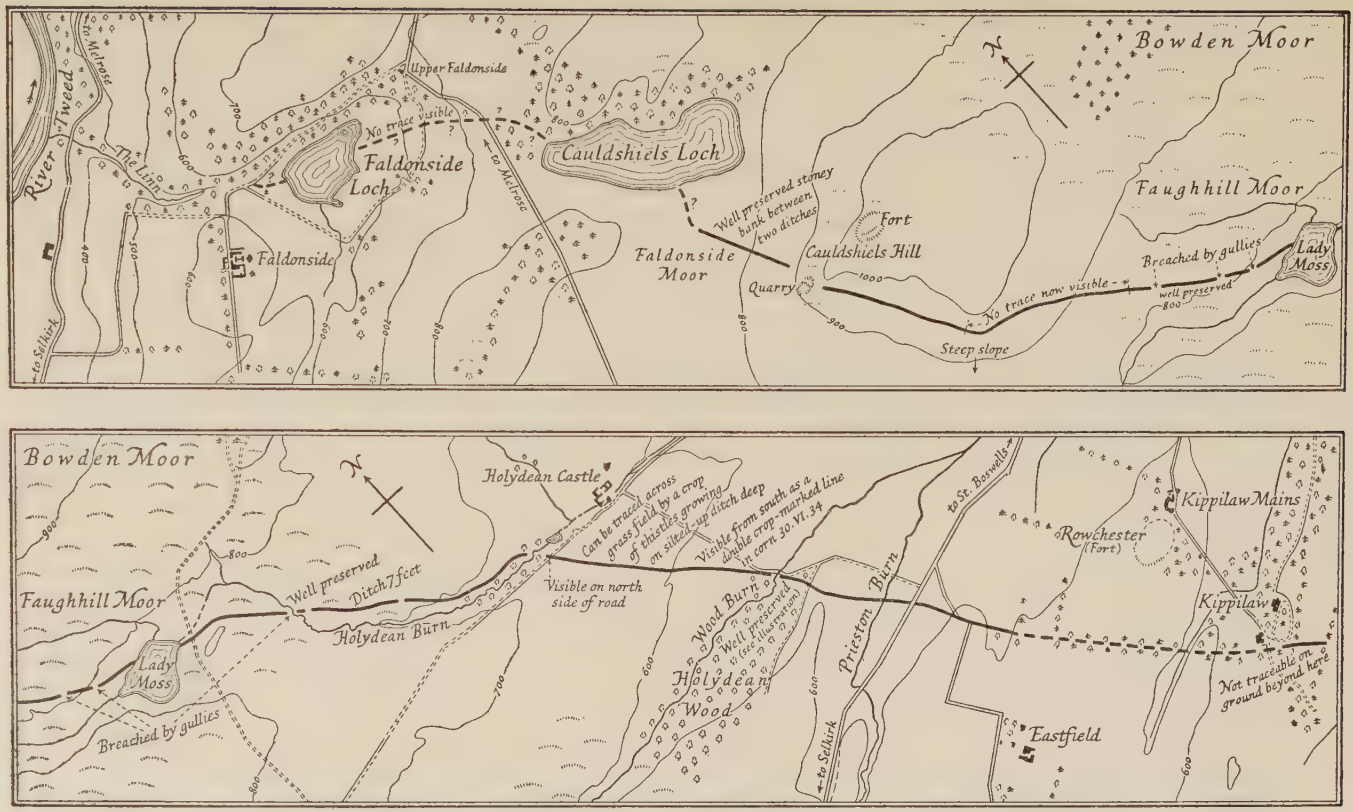
DEFENSIVE FRONTIER-DYKE NEAR MELROSE (PLATE I)

In the *New Statistical Account of Scotland*, 1845, III, 38–9, the following lines appear :—

> 'The remains of a military road, with circular stations or camps, at the distance of from two to three miles from each other, supposed to be Roman, can be traced across the centre of the parish, in a line from southeast to northwest. In some places all vestiges of it are destroyed by the plough, but in other places it can be easily traced in the form of a large ditch, about twenty feet wide, and in a few spots, of two ditches of that width, and about fifty feet distant from each other. The camps or stations are all on eminences in view of each other ; and warlike instruments of various descriptions have been dug up by people ploughing and ditching around them, as well as in the adjacent mosses '.

Following this description the Ordnance Survey adopted the term ' Military Way ' and inserted the course of the earthwork on Sheet N8 of Roxburghshire. I investigated the course of this road in June 1934, and again in March 1935. I was not able to add more than a few yards to the total course of the earthwork however, and I doubt whether any further extension of it in a northwesterly direction can be traced. Southeastwards air-photography might throw light on a possible extension.

The earthwork is not a road at all, but a defensive frontier of a kind that is familiar to us in the South of England, though in execution this earthwork differs from any that I know there, or anywhere else. It consists for the most part, wherever it is sufficiently well preserved to be sure of it, of two banks and three ditches. The ditches are on the southwest side of the banks, so that the earthwork must have been made by people who lived to the northeast of it, and the frontier faces therefore southwest. It seems to begin at the head of a very steep-sided valley at Faldonside, called the Lynn, running into the Tweed, 1100 yards above Abbotsford, but there are no certain traces of it until you



COURSE OF DEFENSIVE FRONTIER NEAR MELROSE

Based upon Ordnance Survey Maps, by permission of H.M. Stationery Office

come to Cauldshiels loch. It seems highly probable however that it followed the line of the county boundary between the loch and the Tweed, taking Faldonside loch on its way over Faldonside moor. It is well preserved between Cauldshiels loch and Cauldshiels hill. Here it consists of a stony bank between two ditches and has been ploughed at some time (PLATE I). This is actually the most northerly point where it can be seen. It runs to the foot of the steep hill and does not seem to have been continued over the brow of the hill through the quarry ; but it begins again immediately south of the quarry and can be traced quite clearly across the fields to the south. It is obvious here that it was made by people living to the northeast of it, since it runs along the brow of a steep slope down which it may be said to look. It also includes a fort on the top of the hill, which may have been used about the time of its construction. Over Faughhill moor it is very well preserved. It makes use of a large mere called Lady Moss and begins again on the eastern shores. It then crosses Holydean burn and is very plainly visible on the north side of the track running parallel to the stream on the south side. Across the next field it can be traced by a thick growth of thistles, though the ditch itself has been completely silted up. In the field immediately to the north of Wood burn, which has been ploughed quite flat, it can be seen quite plainly from the hill to the south as a double crop-mark in the corn. It appears as two parallel bands of darker green colour. As it descends the hill from Wood burn it is excellently preserved, and it is plainly visible across the Prieston burn on the road from Selkirk to St. Boswells. The last visible trace of it are in the grounds of Kippilaw, where it is marked on the Ordnance map. After this it enters an area of former and present arable, beyond which I was unable to see any signs of it.

It should be mentioned that there is a fort at Rowchester, near Kippilaw, also on the northeast side of the dyke.

The total length of the preserved portion of the dyke is a little over three miles, and it is more than a mile from the last visible remains of it at the north end of the Tweed. It may originally therefore have been nearly five miles in length.

Its general line is across the western spur of the Eildon range ; and it may be suggested that it was constructed as a defensive frontier by the inhabitants of the fort on Eildon Hill.

At no point in its course has the earthwork the slightest resemblance to Roman workmanship, and this explanation can be entirely eliminated. Except for a portion north of Cauldshiels hill the dyke nowhere follows

a really straight course, but winds irregularly across the moor. In this respect it differs entirely from the Cleaven dyke, near Meikleour, in Perthshire, which runs straight as a Roman road across the country between the Isla river and some undetermined point further west. It resembles most closely some portions of the Black Pig's dyke in Ireland. The Black Pig's dyke, like it, uses lakes as bounds in its course. It may be suggested that both were barbaric imitations of the Roman walls made by natives, who had either seen one of them or heard about them by repute. O.G.S.C.

AIR- AND GROUND-PHOTOGRAPHY (PLATES II–III)

The question is often asked—Is it possible from the ground to see anything of the crop-sites recorded from above by air-photography? The answer is usually a qualified 'yes'; you can see the crop-markings quite well from the ground, if you can find a suitable elevation near by. There is no magic in either the camera or the overhead view; it is merely the distance above and the view-point that matters. On the other hand, to see a crop-site that has been discovered from the air it is of course desirable to visit it (on the ground) as soon afterwards as possible. The crop-contrasts change rapidly; and of course after the crop has been cut the image, now visible only in the stubble, may become much fainter—though, being lower, easier to get a view of.

The two plates (II–III) illustrate this very well. The first is an oblique air-photograph taken by Major Allen on 26 May 1935, and shows a barrow-circle and other dark markings discovered by him on that occasion near Ogbourne St. George, Wilts (23 SW). The circle, representing the silted-up ditch of a large barrow, is shown as an unbroken black ring, within which are certain faint black spots suggesting cists. The second was taken on the ground a week later. The circle is plainly visible though the colour-contrast is less evident (perhaps for photographic reasons). It is here that the greater height of the corn growing over the ditch is seen.

With a little practice it is possible to spot crop-marks quite easily from the train or car. One cannot always be sure what they represent, but one can at any rate mark the site down for air-photography. Unfortunately there exists no organization by means of which sites thus spotted can be photographed during the short time after discovery that they remain visible.

A VOTIVE OFFERING TO ODYSSEUS

In 1930 a very interesting terracotta fragment was found in the excavations conducted by the British School at Athens, in Polis Bay, on the Island of Ithaca. It is one of a series of about 100 female masks to be dated by their style[1] to the first or second centuries B.C. Εὐχὴν Ὀδύσσει is incised down the side, 'A votive offering to Odysseus'. Across the neck of the goddess there remains $\begin{matrix}\text{H}\\\text{N}\end{matrix}$ which I restore in the usual formula $\begin{matrix}[\text{ὁ δεῖνα ἀνέθ}]\,\text{H}\\[\quad\quad\text{κε}]\,\text{N}\end{matrix}$ 'so and so dedicated it'. The style of the writing suits the date[2] attributed to the terracottas. It cannot be much later than the first century A.D. and nothing later than the first century has been found in the excavation. The sherd was found above sea-level in an unstratified part of the deposit.

There is evidence that the site is a fallen-in cave. Dedications on vases and terracottas of the second and third centuries B.C. show that it was then a shrine and connected both with Odysseus and the nymphs. Part of a pavement in a late Mycenaean layer suggests that the cave may have been a shrine as early as the twelfth century, and as the chain of offerings is unbroken from that date till the destruction of the cave, the shrine may have been connected with Odysseus throughout its history.

Tripod cauldrons of beautiful workmanship belonging to the eighth and ninth centuries B.C. show the importance of the shrine in what is generally thought to be the period of the Homeric poems. Rhodian geometric vases certainly at Aetos,[3] another shrine in Ithaca, perhaps also at Polis, show a connexion between East Greece and Ithaca. The fame of this shrine at Polis must have reached eastern Greece and may have inspired the description of the cave of the nymphs.

Excavation cannot be expected to solve literary problems, but it has discovered a suitable site for Homer's cave of the nymphs and increased the probability that modern Ithaca is the prototype of Homer's Ithaca.

I have to thank the Committee of the British School and Mr Heurtley, the Director of the excavations in Ithaca, for permission to publish this sherd before the appearance of the official publication.

SYLVIA BENTON.

[1] One similar to the inscribed mask is figured by Volgraff *B.C.H.* 1905, fig. 11. Cf. also *id.* fig. 12.

[2] For this information I am indebted to Prof. M. N. Tod. He also suggested this translation for the inscription.

[3] I owe this information to the kindness of Mr C. M. Robertson.

ARCHAEOLOGICAL PHOTOGRAPHY (PLATES IV–V)

At the suggestion of several friends I propose to set down from time to time a few notes on photography arising for the most part out of practical experience. It must be stated at the outset, and with some emphasis, that I do not pretend to possess expert knowledge of photography, or any theoretical background. This may however be an advantage, since few of my readers will possess it either, and what they want to know are the simpler things, such as lighting—if one may judge by results !

The camera I am now using is a Rolleiflex which takes 12 exposures on a spool, the size of each being 6×6 cm. (2¼ inches). This camera has the very great advantage of enabling one to see, on a ground glass screen, the exact picture one will get, and also of enabling one to focus it thus visually. Thus the range of subjects is increased (especially for subjects at 7 yards or nearer). With my previous camera, a Vogtlander, I got very good results indeed for several years, especially landscapes; but for anything less than 7 yards distant it was necessary to rely upon a focussing-scale, which involved careful measurements. Close-ups of moving subjects were thus almost impossible. Close-ups of inscribed stones were a long and tiresome business and not always successful, for at close range one might easily fail to include the whole of the object on the picture, or make a slight error in focussing.

I always use Agfa films, which I believe to be the best. In choosing cameras and films I bear in mind the saying of Socrates that the ἀρετή of a shoe-maker is to make good shoes, and act accordingly. All other considerations are irrelevant.

With a Rolleiflex a tripod is seldom required, though it is useful when a number of similar movable objects have to be photographed in succession, as it saves focussing each time. Personally I use a folding wooden plane-table tripod, whose legs can be screwed at any angle and do not vibrate in wind. For this reason metal tripods are generally quite useless : the camera vibrates in the wind like a big liner crossing the Atlantic.

Perhaps the most important element in obtaining a good picture is the lighting. I do not mean the intensity (though this matters), but the angle. Whether you are photographing earthworks—which are exceedingly difficult subjects—or inscribed stones, success depends in the first instance upon the lighting. Both are corrugated surfaces, one side of which is in shade when the sun is shining—and it is seldom

any good photographing them at all when it is not. That is why air-photographs of earthworks of low elevation have to be taken early or later in the day, when the shadows are long (for examples see 'Air-photography for Archaeologists', Ordnance Survey Professional Paper). In taking oblique air-photographs Major Allen found that there was, in every case, one view-point which gave the best results—usually the one looking into the sun. That is because, from that view-point, you are looking at the shadow-side of every corrugation, with the lighted side visible beyond it by way of contrast. Some of the best ground-snaps are those taken into the sun ; but one must shade the lens, so that the sun does not fall directly upon it, causing reflections and fog.

Precisely the same principles apply to the photography of an inscribed or sculptured stone. If it is fixed you must photograph it when the sun's rays are shining at a very oblique angle to the incised surface. It is no good photographing it when the sun is dead in front (*i.e.* at mid-day when the surface faces due south—unless you are on the equator). It is also no good abusing the stone if it gives you nothing on a rainy day, you must just go again. Some stones (the Bewcastle Cross, for instance) may require more than one visit, but the results will repay the trouble. The accompanying two photographs of the Castle Dor (or Menabilly) stone, near Fowey, Cornwall, were taken within a few minutes of each other from the same spot—PLATE IV with the sun out ; PLATE V with the sun in. On one the inscription (a difficult one) can plainly be seen ; on the other it is quite invisible. The stone is of granite.

In many instances success demands infinite patience and perseverance. Indeed successful photography is due more to these qualities than to any profound expert skill or knowledge, though naturally these are all to the good. To them one might add the habit of observation, enabling one to know the best time to take a given subject. In excavation, the side of a cutting will show much more in certain lights and from certain angles than from others. Here again the angle of incidence of the sun's rays upon the side of the cutting is often the determining factor ; but damp or dryness also affect it.

Other aspects of photography (including that presented to an editor) will be dealt with in future numbers, if these notes are found useful by readers. Criticisms and suggestions are invited. I conclude by again reminding readers that these notes are by an amateur, for amateurs. O.G.S.C.

THE SO-CALLED 'MILITARY WAY' NEAR MELROSE, IN WHAT WAS ONCE HOLYDEAN WOOD, CROSSING WOOD BURN, LOOKING SOUTH, 29 June 1934. (*See* p. 346)
Ph. O. G. S. Crawford

PLATE II

CROP-CIRCLE AND OTHER MARKINGS, OGBOURNE ST. GEORGE, WILTS. (*See* p. 349)
Air-ph. Major G. W. G. Allen, 26 May 1935

PLATE III

FIELD OF CORN AT OGBOURNE ST. GEORGE, WILTS, SHOWING GROUND-VIEW OF A CROP-CIRCLE. (*See* p. 349)
(compare plate II)
Ph. Major G. W. G. Allen, 2 June 1935

CASTLE DOR (OR MENABILLY) STONE, NEAR FOWEY, CORNWALL
taken in sunlight. (*See* p. 352)
Ph. O. G. S. Crawford

CASTLE DOR (OR MENABILLY) STONE, NEAR FOWEY, CORNWALL
taken with the sun in, a few minutes after plate IV. (*See* p. 352)
Ph. O. G. S. Crawford

THE STORY OF THE RATS IN THE WRITING INVENTED AND DEVELOPED BY SULTAN NJOYA

Ph. Max Mills

THE STORY OF THE RATS; AN EXAMPLE OF NATIVE BAMOUN ART. (*See* p. 353)

Ph. Max Mills

FIG. 1
MODEL OF INCA BULL-DOG WITH CROPPED EARS AND UNDIVIDED UPPER LIP, FROM PACASMAYO
Found by the Frankfurt Bolivian Expedition (R. N. Wegner) and now at the Institut für landwirtschaftliche Zoologie of Berlin University. (*See* p. 358)
Ph. W. Glasmacher

FIG. 2
MODEL OF INCA BULL-DOG WITH UNCROPPED EARS, DIVIDED UPPER LIP AND NOSE, FROM TRUJILLO
Found by the Frankfurt Bolivian Expedition, 1927–9, led by R. N. Wegner
Ph. W. Glasmacher

THE STORY OF THE YOUNG RAT (PLATES VI–VII)

In a recent number of ANTIQUITY (Dec. 1935, IX, 435–442) we published an account of the writing invented by Sultan Njoya. A copy of this was despatched to the reigning Sultan at Fumban,* French Cameroon. In due course a reply was received from the Sultan enclosing an original copy of the Story of the Young Rat, illustrated by coloured drawings. These are an excellent example of a live folk-art, apparently uninfluenced by any external art; but in any case alive and vigorous. We publish them both herewith: the folk-tale has been translated from the French translation supplied. We are extremely grateful to His Highness for sending us this most interesting tale and its accompanying illustrations.

THE TALE OF THE RAT AND HER FOUR CHILDREN

A rat had four children. Of these four children three were good and one bad. She went out for a walk with them. She came to a great river and made the three good ones cross it, leaving the bad one behind. He remained there, and asked a traveller to take him across the river. The traveller was rude to him and said: 'What, has your mother taken all your brothers across and left you for me to come and carry you'? He went away. All those who passed that way gave the same reply to the young rat. At last there came a traveller who took pity on the unhappy one and took him across the river. The ugly young rat followed his benefactor, who was travelling to do business in a far country. When the merchant reached the market-place whither he was going, he left the young rat there and it could not find him again. The ugly rat went to a hut, climbed on the roof and killed a mouse, then he skinned him and made a tom-tom which he covered with its skin. Then he climbed a tree in the middle of the market-place taking his tom-tom with him. He beat his tom-tom saying: 'Where can I find the man who has just escaped from me'? Many people gathered round the ugly rat to look at him; then the man who had accompanied the young rat came in his turn to look at the tom-tom. When he arrived in the middle of the crowd, the young rat recognized him, dropped his tom-tom and rushed up to him, saying: 'There's my man'. The man answered - 'Ha! you creature, are you fated never to leave me? Get off my neck and go away'! The rat refused.

* Lat. 5° 40′ N. Long. 10° 50′ E.

The man was angry and departed with the young rat on his neck. When he reached the river he seized the young rat by the neck and threw him into the river. The current carried him into a fish-trap. He died, decomposed, and only his head was left. When the owner of the fish-trap came to inspect it, he saw the young rat's head which muttered : ' Come here and see what the son of the king of the Great Heads can do '. The man was not alarmed and went to take his fish-trap. The rat's head said again : ' Take me out and you will see what the son of the king of the Great Heads can do '. The man took it out and carried it back to his hut. When he got there, the head said to him again : ' Cut me up and see what the son of the king of the Great Heads can do '. The man struck the head of the young rat with his knife. He gave it to his wife who cooked it with maize-bread. While being eaten, the rat's head said to the woman : ' Do not swallow my bones ; collect them all afterwards and throw them on the dung-heap '. The woman obeyed and did as the rat's head had ordered. Her husband swallowed all the bones. Afterwards he had need to retire, but for several days without effect. As he was striving there passed out a big dog. He was not alarmed ; he called the dog to him and went off hunting with it. It was a good hunting-dog. The dog was well fed ; he caught all kinds of animals, from elephants to the smallest game. The man sold the flesh of the animals, grew rich and became a big merchant.

A part of the skull of the young rat which the man's wife had thrown on the midden produced several kinds of calabash. When these ripened the man went with his wife and emptied them into the stream. His wife made saucers and oil-flasks of some of them ; he made wine-flasks out of the rest. The woman had a baby. The man and his wife owned an orchard. The season of husbandry arrived They left some food with their child's keeper, so that he might give it to the child later. A moment afterwards the keeper wished to give the child food. But the calabashes, the saucers, the oil-flasks and cups came down from the pegs on which they were hung and turned into young rats, they seized the keeper's food and ate it. They went back and hung themselves up again. When the man and his wife came back from the plantation, the keeper narrated what had happened, but they would not believe him. They said it was he who had eaten the child's food and that he was a liar. They proposed to hide themselves so as to find out whether the keeper's story was true. He accepted the offer and told them to get on with it. They hid and saw the calabashes get off their

pegs and act as the child's guardian had described. They came out and prevented the calabashes as one prevents human beings, yes, really. They broke them all. A piece of the calabashes got into the head of the woman's husband and stuck in it. They tried in vain to remove it. The fragment began to cry out in the man's head, 'Kpame ninga ninga! Kpame ninga ninga ninga'! in an untiring fashion until the man had a head-ache; the man called that 'Pa ngé shi' (his finery).

He went about everywhere accompanied by this interminable refrain. He betook himself to the country of the Bamilékés, to trade there. When he arrived there, the Bamilékés took it to be a fine piece of music and collected round the man with the piece of singing calabash in his head. A Bamiléké was much interested in it and asked the Bamoun to exchange his music for a boss which he had on his forehead. The Bamoun agreed, but only on the condition that the Bamiléké should give something else in addition, as his music was very valuable. Several Bamilékés urged their comrade to agree to hand over a large sum to the Bamoun to get his music, for they too would support him by adding their contribution; later they would come in their turn and borrow the music. After discussion the Bamilékés handed over a large sum to their fellow-countryman who in turn handed it over to the Bamoun. The latter first had his wealth conveyed home by his Bamoun fellows. After two days the Bamoun told the Bamiléké to hit his head. Then the piece of calabash passed to the head of the Bamiléké and the boss to the head of the Bamoun. The head of the latter was no longer bad. The piece of calabash began to sing in the head of the Bamiléké and started his head aching. The Bamoun had already gone off with his boss and was far away. The Bamiléké grew impatient and called out to the Bamoun to come back and fetch his music and to give him back his boss. But in vain; the thing remained in his head. The story is ended.

EARLY IRON IN EGYPT

In his article on 'The Coming of Iron' in ANTIQUITY for March 1936 (x, 5–24), Mr G. A. Wainwright draws attention to the pieces of iron from the Great Pyramid (IVth Dynasty)[1] and Abydos (VIth Dynasty).[2] These should date respectively from *c.*2900 and *c.* 2500 B.C. (pp. 8–9), and form the two major items in the serious evidence

[1] Vyse, *The Pyramids of Gizeh*, I, 275–6.

[2] Petrie, *Abydos*, II, 33.

for the use of iron in Egypt before the New Kingdom. His question is whether they are of terrestrial or meteoric origin, with the rider that if proved by analysis to be terrestrial their claim to be ancient ought to be most critically regarded. Meteoric origin (p. 7) will be proved by the presence of nickel, probably from 5 to 10 per cent., for this is absent from iron smelted from terrestrial ore.

Both these pieces are in the British Museum. Mr Wainwright states (p. 9) that ' full analyses have not yet been made ' of them, ' but those which have showed " traces " of nickel '; the authority he quotes being a letter written in 1927 to the Editor of *Man* by Dr. T. A. Rickard. This letter (*Man*, 1927, 56) stresses the unlikelihood of any but a meteoric origin for early pieces of iron, and urges examination for nickel to prove this : it states that in fact both these pieces ' were tested recently, at my suggestion, for nickel, and traces of nickel were found ', but expresses dissatisfaction with the experiment.

The tests were actually made in the British Museum Laboratory, and since it seems desirable that the matter should be cleared up, Dr. H. J. Plenderleith, who did the work, has kindly allowed me to see his notes and copies of his reports. The Pyramid piece was found to consist ' of a thin film of metallic iron with a more or less thick coating of its oxides '. Samples were examined, and ' no nickel could be detected '. This was in November 1926 ; in April 1932 it was examined again, and the results ' completely bear out the findings of the previous analytical report as regards the absence of nickel ' ; separate tests were applied to the exterior scale and to the surface of the metallic iron itself, and nowhere could nickel be detected. As Dr. Plenderleith was advised that ' all known meteoric iron contains some nickel, about 4–30 per cent ', he considered it ' unnecessary to go any further in the matter of chemical investigation '. The account of the result quoted from *Man* (cf. also Dr. Rickard's *Man and Metals* 1932, II, 834) seems therefore to have misled Mr Wainwright. The Pyramid piece contains no detectable ' traces ' of nickel. With the Abydos piece the case is only slightly different. The lump (figured with the associated copper objects in B.M. *Bronze Age Guide* (1920), 172, FIG. 185) consists of a black crystalline core surrounded by a thick layer of rust : Dr. Plenderleith reported (in November 1926) that the former consisted ' almost entirely of the oxides of iron. The only impurity detected was a trace of phosphate. No nickel was found '. The rust, examined separately, ' is composed largely of oxides of iron and sand. It also contains traces of phosphate, sulphur, and carbon, with a notable

quantity of copper ' (the latter comes from the flat copper plate on to which the lump had rusted, as shown in the *Guide* figure) ; further, ' a very careful examination was made for nickel, which was found present, in two different samples, in minute traces only '. It may safely be said that this piece, whose VIth Dynasty age has not been disputed, is not of meteoric origin either, for there is no nickel in the core, and it is only present in minute traces in the outer rust, among various other impurities, whose presence is evidently due to the porous nature of that material.

Unfortunately, in the account of this test published by the Society of Antiquaries, in the form of a note in the *Antiquaries Journal* (VII, 193), the descriptions of the core and of the rust were accidentally transposed, so that the impurities of the latter are wrongly attributed to the former, and it is desirable to call attention to this slip, though Mr Wainwright's article does not refer to the note in question.

In fact, the evidence of Dr. Plenderleith's reports is surely conclusive : neither the Pyramid nor the Abydos piece is of meteoric iron. It seems hardly necessary to explain away the former (with Rickard and Wilkinson) as a fragment from an excavating workman's tool, whatever the truth about the enigmatic Nubian spearhead (Mr Wainwright's pp. 9–11) ; the Abydos date is certain, and the 28th century B.C. is equally certain for the smelted iron dagger-blade from Tell Asmar, Mesopotamia (his pp. 7–8). The above notes, with a full covering letter of explanation, have been submitted to Professor Cecil H. Desch, of the National Physical Laboratory. He has expressed his opinion, in a letter kindly communicated to the writer, that the position is ' very clear, and it does not seem necessary to make further analyses '. ' I gather ' he goes on, ' that the crust on the outside of the Abydos specimen contained a good deal of copper (see above), and the trace of nickel which was found may very well have come from that. I have now obtained further specimens of early iron, which is certainly not meteoritic, from sites in Mesopotamia and Syria, and it will be very interesting if it should prove that equally early specimens occur in Egypt. As regards the Pyramid specimen, the statement that it consists of only a thin film of iron with a layer of oxide outside seems to rule out the possibility of its being a modern tool which had fallen into a cavity, and it is very desirable that your note should be published '.

It seems, then, that these pieces may reasonably be taken as evidence for the occasional smelting of terrestrial iron-ores in the Near East as early as the third millennium B.C. CHRISTOPHER HAWKES.

SHEEP

Mr Miles Burkitt writes :—

' Professor Max Hilzheimer's article on sheep which appears in the June number of ANTIQUITY is very interesting, but in fairness to the late Professor Cossar Ewart of Edinburgh, I feel that one must take exception to the opening paragraph, which stresses the *recent* work done on this subject. Most of what appears will be found in Cossar Ewart's articles on various domestic animals which appeared as long ago as 1913 and 1914. It is true that the Professor buried his " diamonds " in, to archaeologists, the unknown " blue ground " of the " Transactions of the Highland and Agricultural Society of Scotland " ; but in my own *Our Early Ancestors* (1926) his conclusions are largely set forth with due acknowledgments. I do not mean, of course, to imply that there has been any plagiarism—merely that it is a great pity that so much recent research work has been spent on what Cossar Ewart so ably set forth no less than 23 years ago. For instance Professor Hilzheimer spends some time in flogging a dead horse when he enlarges on the reasons why the turbary sheep can hardly be a descendant of the Argali. All this has been discussed long ago by Ewart and others, and in my own book, just referred to, its ancestry is suggested as Urial—*i.e.*, Vignei. Naturally no two accounts of such a subject are complete duplicates, and there are details in each which do not appear in the other : the Mesopotamian illustrations were unknown in 1913. But the honour for the pioneer work of this nature on domestic animals properly belongs to the late Professor Cossar Ewart. Another eminent Briton, Sir Alfred Pease, has also engaged in research in the greatest detail into the pedigrees of both domestic sheep and horses '.

THE INCA BULL-DOG (PLATE VIII)

About 50 years ago great surprise was caused in zoological circles by the identification, amongst the animal remains recovered by Reiss and Stöbel in the cemetery of Ancon in Peru, of a breed of dog whose skull and other bones, especially the extremities, had the closest affinities with those of a small bull-dog. Since then further remains have come to light, including mummified specimens. Hitherto, however, we have been content to establish anatomical similarities without puzzling over the appearance of this remarkable breed (beyond its head). It was accepted that it must have looked like the English bull-dog.

Now the Frankfurt Bolivian expedition (1927–9), led by Richard N. Wegner, has brought back a number of vases (of the ' black-ware ' type) portraying this bull-dog in a very naturalistic style. They show that we are concerned with a small elongated animal with a big head and erect ' bat's-ears ', which finds its closest parallel in the French dwarf bull-dog. The resemblance is positively amazing, as may be seen from numerous instances. Many ' defects ' can be observed, as with our bull-dogs—the divided nose, with which goes the divided lips leaving the upper lip and teeth free, the concave nasal bridge, etc. All these features were recorded with the greatest fidelity by the old Peruvian artists who, by indicating them on several models, have provided us with a real portrait of the dogs. When, moreover, we find that some of these models have short ears and some long, we are justified in regarding the portraits as faithful ones, and in concluding that the ancient Peruvians sometimes represented individual dogs.

Hitherto, however, these dog-models are recorded exclusively from northern Peru. They thus appear to be confined to the Chimu culture-circle, where they seem to have some connexion with a fertility-cult. This I infer from the fact that, in lying models, the hindquarters are twisted round into a rather unnatural position, so as to show the sex-organs, and that females with young are frequently represented.

Osteological research reveals certain points of difference between these American bull-dogs and the European breed ; from which it follows that the one has not developed out of the other and that the ancient Peruvian constitutes a unique breed of its own. This breed, which is found only in the pre-Columbian period, is to-day extinct.

MAX HILZHEIMER.

THE SOAY SHEEP (PLATE IX)

An unfortunate mistake (which the translator regrets) crept into Dr Hilzheimer's article on Sheep in the June number of ANTIQUITY. The animal there shown (PLATE IV) is not, as stated, a representative of the European breed of wild sheep, *i.e.* the Mouflon, but is a Soay sheep. Dr Hilzheimer writes :—

' While this breed is in very close relation to the wild sheep, it also resembles the oldest European domestic breed, the Turbary. In this lies the special interest of the Soay sheep, which certainly is a survival of the very earliest period of breeding. The resemblance between the modern animal and its Stone Age counterpart may be realized by

comparing the photograph in my article of a Soay ram with that of the neolithic clay-figure. The former is represented in profile, bringing out the long sunken features peculiar to the wild sheep : the non-specialist would perhaps be better able to compare them by seeing a frontal view, as then the similarity of the horn-formation is still more striking. This is shown by the photograph (PLATE IX) taken recently by Mr O. G. S. Crawford near Tarbert, Isle of Harris, in the Hebrides. The hair on the throat is short because the sheep was photographed in June, when it had already begun to shed its coat.

' From what I hear this most important breed is in danger of extinction on account of economic conditions. This would be a great pity, in view of the extreme interest of the Soay sheep, which lived in Harris in a completely wild state, owning no master. As far as my knowledge goes there are examples of the Soay in the Zoological Gardens in Edinburgh, Berlin, and Hamburg, but it is doubtful if this will suffice to keep the breed alive. Perhaps some Scottish laird will form a small herd in his game-preserve. This would not involve much trouble or expense ; but it would ensure the existence of this sheep and would be at least as interesting to the sportsman as the Corsican-Sardinian Mouflon, which of late years has been introduced into the Continent. The Soay sheep would have the advantage over it of being more sure-footed '.

PLATE IX

SOAY SHEEP, NEAR TARBERT, ISLE OF HARRIS, HEBRIDES. (*See* p. 359)
Ph. O. G. S. Crawford

facing p. 360

Recent Events

The Editor is not always able to verify information taken from the daily press and other sources and cannot therefore assume responsibility for it.

Mr James R. Stewart writes from Afyon Karahissar :—' I have been digging (for Cambridge, with the collaboration of the German Archaeological Institute) in a looted necropolis of the Yortan type. Although the looting had been thorough, our results seem quite satisfactory. Here are some of the details.

' The site lies near the village of Baba Koy, in the Bigadiç area of the Balikesir vilayat. Burial is invariably in a large red-ware pithos, which very possibly showed above ground, for the pithoi are neatly arranged in lines, rather like a war cemetery. Although single inhumation-burial seems to have been the rule, re-use of pithos was frequent.

' The pottery was chiefly of the usual Yortan type. I believe that much of the loot is in European Museums as from Balikesir. However, there is a sprinkling of drab ware occurring in shapes different from the Yortan type—including a goblet on a ring-base, and an idol. We found no red ware, but the peasants reported the existence of a few pieces. Bronze or copper was to us non-existent, but one of the men remembered two copper needles.

' We were fortunate enough to get one intact grave, a pot from which gives us a contact with the Early Bronze Age at Vounous in Cyprus (tomb 39) ; so that at long last the period of Yortan ware may be regarded as belonging to the latter half of the third millennium B.C., but perhaps starting a little earlier '.

Mr E. J. Forsdyke, the new Director of the British Museum, in a most interesting article in *The Times* (22 May), describes the results of recent American excavations at Troy, which have at last settled the point at which the ' Achaean moment ' occurs. He concludes :—

'Professor Blegen has already found that the beginning of the Sixth City, hitherto called Mycenaean, goes far back into the Middle Helladic period, before the Mycenaean Age began. The fortress-wall was built after this and the towers were a later addition to the wall.

About 1300 B.C. this settlement was destroyed and the wall much damaged, apparently by an earthquake, since there is no trace of fire. The Seventh City was an inferior reconstruction of the sixth. The wall was repaired in rougher masonry, the houses irregularly built with odd stones from the ruins. This was Homeric Troy, and it was destroyed by fire about 1200 B.C. The wall still stood ; the houses were rebuilt and inhabited presumably by the Achaean conquerors. The final destruction of the fortress came later, in the Dark Age of the Aegean, at a time and by an agency which are not yet determined and of which we have no epic record'.

In a recent lecture Sir Denison Ross, Director of the School of Oriental Studies in London said that Chinese Turkestan, inhabited today mostly by Turki-speaking Muslims, was for centuries regarded as essentially a land of the Turks. Recent discoveries, however, had proved that down to the 8th century it was the home of peoples speaking various Indo-Germanic languages. He recalled the amazing discovery of manuscripts made nearly 40 years ago by Sir Aurel Stein in the Caves of the Thousand Buddhas, near Tun-huang, consisting of thousands of Buddhist and other manuscripts and books. (*Great Britain and the East*, 20 February).

Sir Aurel Stein is proposing to carry out an air-survey of Transjordan and part of Iraq, to determine the character of the frontier defences of the Roman Empire there. No finer field for such work exists anywhere, and we hope for the credit of British prestige that he will succeed. The results will be of the greatest scientific value, and will fit nicely into the scheme for a map of the Roman Empire on a scale of 1 : 1,000,000 which is being organized by the Bureau Central of the International Map of the World on the same scale. (*Nature*, 11 July).

Sir Leonard Woolley, in a lecture on ' The Racial Elements in Sumerian Art-history ' (published in the Journal of the Royal Society of Arts, LXXXIV, 3 April 1936) distinguishes three cultural streams (1) an Asiatic or Iranian, characterized by painted pottery, and prediluvial in age at Ur ; (2) an Anatolian ; (3) a Syrian. These, he submits,

correspond to three differentiated physical types in the population. He concludes that the brilliant achievement of Sumerian art, in which these cultural streams unite, was due to that cross-fertilization of racial strains which he maintains lies at the root of all great achievements in the art of a people as a whole. (*Nature*, 11 July).

A correspondent of the Glasgow *Herald* (11 July) has some pertinent remarks of a general nature on a similar subject. After pointing out that ' modern archaeology . . . begins to have a practical and sometimes disquieting bearing upon the problems of the present ', he points out that it has revealed ' the illimitable background of human development ', in relation to which the period we live in is seen to be merely a stage in a tremendous process, whose end is far out of sight. He asks whether any modern scientific achievement is as important as the discovery of agriculture by neolithic man.

He passes on to the question of ' racial purity ' which he rightly discusses as a ' meaningless phrase ', the thing never having existed either in the past or present. He concludes with the following sensible reflexions :—

' And if racialism in the light of archaeology appears a myth, what of nationalism ? What does " nation " mean ? Has a " nation " some fundamental unity which cuts it clearly apart ? It is true that a nation does mean something separate and distinct : it is a group bound together by a common history within a limited period of time, sometimes a common language, nearly always a common social organisation, and—what is practically of most importance—a common tradition of sentiment. But, viewed from the archaeological standpoint, a nation is merely a particular phase in the evolution of human groups, as the tribe and the clan have been in the past. So far from representing anything permanent, the nation is in flux under our very eyes.

' Politically the plain lesson of archaeology is that in the past history of humanity intercourse has been fruitful of progress while isolation has produced stagnation and decay. A common stock of cultural tradition has been slowly accumulated by the contribution of all the civilisations of the past. To that common stock the life of any group or " nation " or " race " is related as the branch is to the tree. For any group to deny its common cultural ancestry, to imagine that

all excellences are its particular prerogative, or to exalt separateness into a creed is folly—and pernicious folly at that'.

Readers of M. Henri Lavachery's interesting article on Easter Island (ANTIQUITY, 1936, IX, 54–60) will be amused to learn from the *Morning Post* (6 April), that the ' mystery of Easter Island ' has been solved by the officers of a ' little Chilian naval tanker ', who spent 6 days there. Lieutenant Exequiel Rodriguez regards Easter Island as a link connecting the Inca civilization with a ' contemporary Indo-Iranian culture ', the island itself being the ' sole remaining speck ' of ' the fabled continent of Mu '.

A new Java skull is reported from Modjokerto in that island. It is said to be of a most primitive type. The scientific description of it will be eagerly awaited. (*Evening Standard*, 7 May).

It is very good news indeed to hear that a crannog of the Bronze Age has been found in Ireland, at Knocklappa, co. Clare. The finds include a bronze sword and a bronze gouge. An inhabited site of this period, which should yield quantities of pottery and other objects, should throw a flood of much-needed light upon Irish prehistory. It is to be scientifically excavated. (*Irish Times*, 29 May).

There is no evidence of the presence of rabbits in England before the Norman Conquest. (Guy Dollman in *The Times*, 29 April).

We regret that, in the last number (p. 231) we failed to correct an obvious error. In line four '*Lower* Egypt' should of course be ' *Upper* Egypt ', and the author of the words in question informs us that he actually said 'Upper'. He could, of course, never have made such an elementary mistake. But to his reporters, ' Upper ' Egypt is the part which comes highest in the map, regardless of the flow of the Nile.

The fort at Kildonald (or Kildonan) on the east coast of Kintyre, in the well-preserved walls of which cells and galleries had been

noticed, was excavated in June by Mr H. Fairhurst of Glasgow University on behalf of the Kintyre Archaeological Society. The season's preliminary work rendered possible the distinction of at least three architectural periods representing reconstructions of the fine entrance. The relics also amply justify a continuation of the work on a larger scale in 1937.

Mr W. Thorneycroft and Prof. V. G. Childe have excavated the well-known vitrified fort of Rahoy on Loch Teacuis in the Morvern district of Argyll. An early fibula and one of those transitional iron axes that reproduce the form of a socketed bronze axe (the 13th specimen of the type) were recovered and many important geological observations tending to elucidate the process of vitrifaction were made.

Five books which should interest many readers of this journal have recently been published. Reviews will be published in due course. Meanwhile it is proper to call special attention to them. 'Man makes himself', by Professor Gordon Childe (Watts, 7*s* 6*d*), is a supremely good popular account of what the title says. It is the book we have long been waiting for and we doubt whether anyone else alive could have written it. 'The Oxford Dictionary of English Place-names', by Professor Ekwall (Oxford Press, 10*s* 6*d*), is a little masterpiece by a master of the subject. Those interested in the derivation of place-names will revel in it. 'An historical geography of England before 1800: fourteen studies, edited by H. C. Darby' (Cambridge Press, 25*s*), is a book that prehistorians as well as geographers will require. The 87 figures are all map-diagrams, as they should be. It is a book of first-rate quality. 'The ancient burial-mounds of England', by L. V. Grinsell (Methuen, 12*s* 6*d*), is a book that has, we think, come to stay, and is one that all open-air archaeologists should get. There is no existing book that covers the same ground. Some short-comings can easily be removed in subsequent editions. Last, in a class by itself, comes the Society of Antiquaries Research Committee's Report on the recent excavations at Verulamium, by Dr and Mrs Mortimer Wheeler (Society of Antiquaries, 15*s*). Both the Report itself and the work which it describes make us feel proud of British archaeology, and are a poignant reminder of the irreparable gap which the death of Mrs Wheeler leaves in our ranks.

Reviews

THE PALACE OF MINOS AT KNOSSOS : a comparative account of the successive stages of the Early Cretan Civilization as illustrated by the discoveries at Knossos. *By* Sir Arthur Evans*. Vol. iv, 2 *parts*. *Macmillan and Co.*, 1935. *pp.* xxxvi, xvi, 1018, *plans and coloured and supplementary plates* (1–69) *and* 966 *text-figures*. £9 9*s*.

The first part of the new volume contains sections 90 to 99, the last with a supplement. In § 90 Sir Arthur explains the methods adopted by him in the restoration and reconstruction. In § 91 the bull-sports are discussed and the relation of the Minoan mother-goddess to them. The Toranto goddess is thus introduced and a new stone statuette resembling the Fitzwilliam goddess. In § 92 the discoveries of 1930 on the west of the palace are described ; in § 93 MM Ia–MM IIb pottery, especially of the polychrome and barbotine class is considered in detail. § 94 is an interesting essay on the domestic snake cult, which leads up to a discussion (§ 95) of the sacred adder ornament, of a newly emerged statuette of the snake goddess, and of cult objects in § 96. § 97 introduces the controversial question of the date of the ' Treasury of Atreus ' ; in §§ 98, 99 Sir Arthur draws out with expert knowledge the evolution of ornaments in Palace Style vases, and their successors. A supplement dealing with pedestalled goblets brings the first part to a close.

The second part opens with a discussion (§ 100) of the camp-stool frescoes of the ritual cups of Syrian and oriental connexions in the LM I period (§§ 101–2) and of Minoan genii (§ 103). § 104 introduces a new chryselephantine figure, and a discussion on hair-offerings. §§ 105–9 deal with Minoan bead-seals, signet-rings and clay impressions. The subject is fully treated, the classification being based chiefly on Sir Arthur's own collection ; of the late seal-impressions a summary catalogue is given, arranged according to find-spots. The last of these sections (109) includes a discussion of the Minoan storage and metrological system. In §§ 110–12 the Minoan script is exhaustively described, and these are supplemented in § 113 by a digression on the Minoan remains at Ras Shamra, which leads up to a full treatment of Minoan chariots, armature and swords. The Last Palatial Age is the subject of §§ 116a, 116b ; the layout of the palace after the catastrophe of LM Ib, and as it appeared when the final catastrophe took place about 1400 B.C., being described in detail. The volume closes with an epilogue divided into four parts ; the first two deal with the ' ring of Minos ', the last two with the Temple Tomb discovered in 1931, and the traces of a late memorial cult associated with it.

The agglutinative arrangement of the material is in conformity with that of previous volumes, and, no doubt, largely unavoidable, owing to the need for keeping pace with fresh discoveries. It is nevertheless unfortunate that details of the excavation should be embedded (rather sparsely) in a series of essays so that they can be extracted only with difficulty. A less subjective treatment, coupled with a more methodical arrangement would have satisfied modern requirements better, and it will be the task of the future to re-arrange the material in a more serviceable form, separate basic facts from their less factual superstructure, give a coherent account of the layout of the palace at

* Volume III was reviewed in Antiquity 1931, v, 315.

each stage, with an inventory of the finds according to their precise find-spots. The essays on the various classes of objects will have to be kept apart from the description of the site, and each class will have to be dealt with comprehensively, through each stage of its history. Only thus will a satisfactory picture of a very complex site be obtained.

So much with regard to the general layout of the material. As regards particular points, Sir Arthur resumes his well-known arguments against Wace's dating of the 'Treasury of Atreus' and, in order to dispose of the evidence of the sherd below the threshold, adds another argument. This sherd, on the analogy of similar fragments of similar bowls found in the lowest levels of the deposit by the Lion Gate was pronounced by Wace to be early LH III (*i.e.* about 1400 B.C.) and thus to confirm the evidence from tests made below the walls of the dromos and from objects found by Stamatakis in the dromos and doorway as to the date of the construction of the tholos. Sir Arthur's new argument is that bowls of this class and with this kind of ornament belong to the very end of LH III (*i.e.* about 1200 B.C.) and that the presence of these bowls (together with certain hydrias which he also believes to be late) show that this deposit is not stratified at all, and is, in fact, an 'inextricable jumble'.

Hutchinson has given some reason for thinking that the deposit was not laid down as early as Wace supposes, but nearer 1300 than 1400; but, even so, it is not surprising that the sherds of El-Amarna type should occur in higher levels, since El-Amarna vases did not cease to be made or exported because El-Amarna ceased to be occupied. There is good evidence that they continued to circulate until the second half of the thirteenth century. If the hydrias are as late as Sir Arthur supposes, then their presence in the lowest levels would be decisive for the unstratified character of the deposit. But are they? For various reasons, I incline to think that the deposit at the Lion Gate belongs mainly to the thirteenth century, to which both the panel and 'close' style should be assigned. The 'close' style fragment in level 1 would not then be out of place.

But if this is so, then the construction of the Tholos must be assigned to the end rather than the beginning of the fourteenth century. For, whatever the date of the sherd, that must also be the date of the construction of the tholos. The evidence of its find-spot cannot be got round by any kind of argument. Do the other objects from the tests and from Stamatakis' excavations conflict with such a date? Not necessarily. The architectural analogies with Knossos are not, by themselves, conclusive. The rosette-triglyph ornament occurs in painted stucco on the porch and court of the Megaron (14th century) and, as the Tirqus signet shows, was current still later. There seems little objection to suppose that it could not be employed architecturally at any time during the fourteenth or thirteenth century, a period during which mainland art, if not static, changed, to judge from the pottery, very gradually. And, if it should be proved that the sherd must be dated as late as 1250, would there be any insuperable objection to dating the tholos to somewhere about the same time?

In his anxiety to do justice to Crete's outstanding contribution to civilization, Sir Arthur fails to appreciate the non-Minoan element in mainland art. This element he just admits for certain objects from the shaft-graves, but not for the stelae themselves. But, whereas it is conceivable that a mainland stone-cutter could have produced the spiraliform ornaments, which, given the models, are merely in question of careful measurement and spacing, it is inconceivable that a Minoan should have produced the figure-scenes. To say that they are the work of Minoan goldsmiths working in an unfamiliar material does not explain the unskilful drawing and composition, nor the rather clumsy arrangement in registers; and the whole group must be regarded as the work of

mainland masons. The most that can be said is that stele 1 shows an attempt, though a poor one, to imitate a Minoan work of some kind.

Similarly, Sir Arthur declines to recognize a creative element in mainland art. Yet the ' Treasury of Atreus ', in spite of the fact that the layout and the ornamental details are ultimately derived from Crete, is, in character, non-Minoan. The proportions of the tomb, especially of the façade with its slim columns are foreign to the Minoan conceptions and genius, and must be placed to the credit of mainland architects. Sir Arthur's preoccupation with Cretan things has also at times obscured his aesthetic judgments. Minoan ceramic art is not uniformly good, and largely owing to a perpetual indecision between naturalizing and formalizing tendencies sometimes sank very low. Some of the vases which Sir Arthur selects for admiration are unworthy of it ; the barbotine vases and the vases with plastic shells stuck about them (*e.g.* fig. 83) are peculiar but not beautiful ; it is moreover questionable whether the sides of a vase are suitable for anything but formal designs, and the imitation in clay of metal vases is in principle bad and in practice seldom successful.

So, the new stone figurines, even if genuine, are insipid, and the same is true of the Thisbe seals and rings. Why is it that any one of them, inserted among a group of indisputably genuine Minoan gems, etc., at once hits the eye as being out of keeping with the rest? Sir Arthur asks how could the forger of the ring which bears the ritual scene of pouring liquid have had prophetic insight and anticipated discoveries not yet made ; one might also ask how could a Minoan craftsman of about 1500 B.C. have represented an event like the murder of Aegisthus, three hundred years or thereabouts before that event occurred ? Sir Arthur in fact claims for Minoan civilization more than is its due, and, from the extreme significance he attaches to analogies between Minoan and Christian ritual, almost gives the impression that he would like to derive Christianity itself from a Minoan source. Actually, such analogies do not signify anything except that the available symbols for expressing religious belief are limited and spontaneously repeat themselves.

Smaller points. Does the gaudy headdress of the performers in the bull-ring really indicate a ' good social position ' (p. 211)? Is the design in fig. 314b (p. 377) really a double-axe? Has it not occurred unintentionally by the building-in of the space between the loops ? Fig. 391 (p. 466) ; why is the genius essentially of the leonine type ? P. 475 ; was the biretta ever designed to conceal the tonsure ? is it not the *Zuchetto*, quite a different article, of which Sir Arthur is thinking ? Fig. 512 (p. 522) ; why a goat ?

I noted a few slips, *e.g.* p. 128, pl. XXIX should read pl. XXX ; p. 163, fig. 124 is not referred to ; p. 207, pl. XLVIII should read pl. XLIX ; p. 223, line 2, fig. 172 should read fig. 173 ; p. 224, under fig. 173, southwest porch should read northwest porch ; p. 271, Battiscombe Crumm should read Battiscombe Gunn ; p. 279, Dorpfeld should read Dörpfeld ; p. 318, note 2, p. 346 should read p. 345 ; p. 410, note, T. W. Crowfoot should read J. W. Crowfoot ; p. 534, fig. 485, MM III should read LM III ; p. 535, note 1, archäishe should read archäische; p. 583, line 2, 'the see' should read 'see the'; p. 825, note 1, Paribent should read Paribeni.

Sir Arthur's style is of course distinctive. Even if we are reminded at times of a Papal encyclical and at times, in phrases like ' ceramic department ', of a different class of literature, the volume is easily readable, and this readableness is aided by the scale of illustrations, placed, with a thoughtfulness as unusual as it is welcome, in the immediate neighbourhood of that which they illustrate.

An index volume will bring this magnificent work to its close. W. A. HEURTLEY.

HIERATIC PAPYRI IN THE BRITISH MUSEUM. Third Series. Chester Beatty Gift. *Edited by* ALAN H. GARDINER. *British Museum*, 1935. Vol. I. *Text, pp.* XIV *and* 142. Vol. II, 72 *plates in line and* 23 *collotypes.* £4 15*s.*

The eighteen manuscripts (containing portions of about twice that number of separate texts), Brit. Mus. 10682–10699, here edited for the Trustees by Dr Alan Gardiner, are all but one of a collection acquired a few years back by Mr and Mrs Chester Beatty. That one, the ' Chester Beatty Papyrus I ', better known by the title of its most important text, ' The Contendings of Horus and Seth ', and edited by the same scholar, has already been reviewed in ANTIQUITY (1934, VIII, 240). As it surpassed all the other manuscripts in the collection, both for its size and the interest of its contents, so the remainder of the papyri, coming with it from a single find which can almost certainly be located on the west bank of Thebes (Luxor), constitute by far the finest single group of Late Egyptian hieratic texts which has passed into the possession of any museum since the days of Sallier and Anastasi. This very generous gift of Mr and Mrs Chester Beatty gives the British Museum a superiority over all others, the Egyptian Museum at Cairo not excepted, as a place for the study of the palaeography of New Kingdom literary manuscripts. This point is of such importance to students of Egyptology that the reviewer must be forgiven for labouring the indebtedness of the science to Mr and Mrs Beatty in a non-technical journal.

Other technical matters, of great importance to the specialist, must here be passed over with little more than an acknowledgment of gratitude to the editor. It would hardly be possible to convey to anyone who had not seen the mass of fragments of papyri when they reached Dr Gardiner's hands, the skill and patience and scholarship expended during the three or four years which saw the rehabilitation of the texts as we now have them. During the greater part of that time Dr Gardiner had the assistance of Dr Ibscher of Berlin, who has devoted a lifetime to the reconstruction of damaged papyri. The introduction to this edition eloquently testifies to the dependence of successful results on co-operation in equal measure between the scholar and the technical specialist. The actual publication of the texts required the assistance of a third collaborator in the person of Mr H. W. Fairman, who made the hieroglyphic transcriptions throughout. The remarkable consistency of his copies over 72 folio plates is an added distinction to the work.

The contents of the texts are representative of almost the whole range of literature at present known in Late Egyptian, that is, the written language of the period roughly between 1600 and 700 B.C., though the papyri themselves are assigned by the editor to the probable dates 1280–1160 B.C. A fair selection of perhaps the most typical of all Late Egyptian texts—the Student's Miscellanies—copies of homilies, letters, hymns and excerpts from well-known literary works which formed the basis of the scribe's education —are offered in papyri nos. III to V and XIII to XIX. Many of these are duplicates of passages we already possess, including part of the famous Satire on the Trades and the letter of the scribe Hori which occupies the greater part of Anastasi I. But there is much else which treats the thus familar themes with a novel touch, and in papyrus IV an idea not found in Egyptian literature occupies over a page of the text : the scribe's profession is exalted at the expense of all others, not because of the material advantages it brings to the scribe while he is alive, but for the fame of his writings with posterity. ' They (the scribes of old) made not unto themselves pyramids of brass,* with tombstones of

* *i.e.* ' bronze '. Dr Gardiner holds that the spirit of Egyptian literary texts is best reproduced by rendering into the English of the Authorized Version. On this principle he elsewhere translates *ḫsbd* by ' sapphire ' instead of ' lapis lazuli '.

iron. They knew not how to leave heirs that were children (who should ?) pronounce their names. But they made heirs unto themselves of the writings and the books of instruction which they made . . . They are gone, their name is forgotten. (But) writings cause them to be remembered '.

Some important hymns, a book of medical texts, collections of magical spells, fragments of a book of aphrodisiacs, of accounts, of a well-known mythological text, and a fine service-book for the temple of Amen-Rē^{c} at Karnak, known from a similar work in Cairo as the Ritual of Amenophis I, make up the bulk of the remaining body of texts. Briefly listed, as they must be here, these titles convey little idea of the amount or variety of new material they contain, both as ' sources ' for almost every field of Egyptian studies and as increasing our knowledge of the language ; still less of the erudition that has gone to their first interpretation. But in fact they supply an invaluable store of fresh evidence to make full use of which will take many years.

Even so, the two ' plums ' of this library of papyri have not yet been mentioned. They are the short but quite unusual ' Story of the Blinding of Truth ', and the ' Dream Book ', unique so far as Egypt is concerned. ' The Blinding of Truth ' is a fairy story, in which Truth and Falsehood are personified as the older and younger brothers, respectively. Dr Gardiner claims that it is ' the earliest example of allegory in the manner of John Bunyan ', stressing the allegorical character of the story rather than its origin in folk-lore. He is inclined to minimize the ' miraculous ' element in the story ; yet surely this alone gives it point. He says : ' The characters of these two brothers correspond to their names, and the entire plot turns upon the antithesis of right and wrong '. But while Falsehood lives up to his name and more also, no evidence is offered by the story (in the incomplete form it has come down to us) of the ' character ' of Truth, beyond what is implied in the statement—' Falsehood raised his eyes to look, and he saw the virtue of Truth '. Indeed Truth plays a negative part throughout and it is his son, who avenges him, that is the hero. The plot becomes, as Gardiner says, the familiar one of the Osiris legend ; but as in all Egyptian stories with a mythological background right and wrong are set anything but clearly in antithesis ; and, as with Homer's, so with the Egyptian gods, human error is as essential to their make-up as divine virtue. The story (as we have it) opens with what appears to us a most unjust condemnation of Truth by the court of the gods ; and it closes with the same council making amends for their former sentence because the son of Truth has been able to tell a bigger lie than Falsehood. The name of Truth's son is not given in the papyrus. We should hardly call him Pilgrim.

Finally there is the Dream Book, perhaps the most remarkable document in the whole publication. It consists of a series of short sentences, each of which briefly states a dream and is followed by a verdict ' good ' or ' bad ', and an explanation, *e.g.* :—

> ' If a man dreams that he is binding fast baleful men at night, good : taking away his enemies' utterance '.
>
> ' If a man dreams that he is munching a cucumber, bad : it means words will arise with him on his being met '.

In the explanation the words ' it means ' seem to be inserted or omitted at random. Dr Gardiner sees no attempt at classification of the dreams beyond the categories ' good ' and ' bad '. Any enquiry as to how far the dreams may be classified in types known to the modern psychologist would be out of place here, but it is difficult to believe that none of them is based on an elementary understanding of the nature of anxiety dreams and wish-fulfilment dreams.

This review, begun in gratitude to the original donors of these papyri, must end in gratitude to their editor and to the Trustees of the British Museum for the prompt publication. No other scholar alive today could have given the world, in so short a time, so sure an edition of the text, with translation and sufficient notes to enable the layman to follow the story as well as to help the student of Late Egyptian. S. R. K. GLANVILLE.

YIN AND CHOU RESEARCHES, dedicated to the International Exhibition of Chinese Art, London, 1935–6. Papers from the ' Bulletin of the Museums of Far Eastern Antiquities, Stockholm ', nos. 7 and 8, 1935. *pp.* 223, 90 *plates, and many text figures.* £3 3*s.*

First comes Professor Bernhard Karlbeck's epoch-making article ' Yin and Chou in Chinese Bronzes ', taking up two-thirds of the book.

The fifteen hundred years of Chinese history covered by the Shang-yin and Chou dynasties have left us famous literature, including for the later times a surprising amount of historical and personal information, but hardly any material remains, just the Yin inscribed bones and shells from An-yang, some carved ivories and stones, some pottery and, by far the most impressive, the bronze vessels. The physical type of the neolithic predecessors survives in the modern Chinese, but the only material survival seems to be that the triple clay vessel with hollow feet may be represented by the bronze tripod called *li*. The art of bronze-casting appears complete, and we do not know where it arose.

To set the chronology of the bronzes upon a definite basis is to render a great service to our knowledge of Chinese antiquity. Karlgren arranges all the inscribed bronzes of which he has illustrations, so far as they are presumably to be referred to Yin and Chou, nearly 900 in number, in two quite independent series, the one arranged by the data he extracts from the inscriptions, the other in accordance with criteria founded upon the shapes and decoration of the vessels. He then points out correspondences between the two series and so arrives at logically established dates. I say ' logically ', because in a way that I have not space to reproduce, he provides for and meets all the logical difficulties that arise in such an enquiry.

Reference to this table will make what I have to say more intelligible.

B.C.	EVENTS	CAPITAL	CLASSES OF VESSELS
1766	Accession of Shang Dynasty	An-yang	
1401	Name of Shang superseded by Yin		A
1122	Accession of Chou dynasty, called Western Chou	P'ang in Shen-si	BI (BIII)
947	Accession of King Kung. Climax of Chou		
770	Troubles. Eastern Chou	Lo-yi in Ho-nan	
	Decay of Chou. Rise of Vassal States		BII (BIII) CDE
	Spring and Autumn Annals		
481	Period of Warring States. Gradual emergence of Ch'in state		Huai
c.250	End of Chou, supremacy of Ch'in	Near Hsi-an in Shen-si	
206	Han	Ch'ang-an	

The Chinese were in the habit of commemorating events by casting bronzes with inscriptions. The mention of known sovereigns or other persons (given that the

inscriptions are genuine, and K makes out a good case against undue scepticism) allows him to propose a chronological series (B I, 1–40) attributable to particular reigns of the first five Chou kings (1122–947 B.C.) and another (B II, 78–107) attributable to the next eight (947–770 B.C.): similarity of script lets him ascribe another lot (B I, 41–77) to the first five, and another (B II, 108–152) to the next eight, while certain bronzes (B III, 153–182) can only be generally assigned to Royal Western Chou (1122–770 B.C.). Another class C (1–197) bears mention of various vassal states: as we know when these succumbed in the civil wars we get *terminos ante quos*. Allied to this is class D (1–137) bearing the names of noble families who flourished in the vassal states: C and D are mostly shown to be late Chou, after 770 B.C. by a new custom of choosing lucky days. Class E (1–77) is only dated by the presence of names of the type Chung Shih-fu, very common in B, C and D (otherwise dated): they are shown by the literature to have been used under the earlier Chou, but to have gone out of fashion by 400 B.C.

Finally Karlgren, observing that none of these classes B, C, D, E, all datable to Chou, bear certain signs: *ya* (a cartouche like *ya*=evil), *hsi tzū sun* (=divide ? son, grandson) and *kü* (?) refers a whole class (A, 1–337) to Yin times. So he makes up some 900 bronzes of which illustrations of varying quality are available and which bear inscribed indications of their probable dates.

Next working on the illustrations and direct knowledge, he considers what criteria are afforded by the forms and decorative motives, analyzing the casters' repertory of ideas. So he arrives at 69 criteria, what one might call ' points ', and looks to see what points occur in the various classes.

He finds 38 points peculiar to 303 out of his 337 bronzes in Class A (34 being unclear and 3 having presumably forged inscriptions). Accordingly he makes the combination of several of these points the sign of a Yin bronze: they agree with the pottery and carved bones from An-yang, definitely Yin.

When he looks at class B I, earlier Chou down to 946 B.C., he finds practically the same points, and only four new ones (*e.g.* bent handles and the *P'an* basin). That means that Early Chou was practically like Yin: this class he calls Yin-Chou. Half B III comes into it but there are comparatively few pieces from the vassal states (C) and those the central ones near Chou, and few from classes D and E. In all about 116 vessels can be satisfactorily classed as Yin-Chou.

Then suddenly about 950 B.C. comes in quite a new style that he calls Middle Chou with seventeen new points: many old shapes go out, new ones come in, particularly the *chung* bell and the sauce-boat, many old motifs are lost, decoration becomes flatter, the most noticeable new motif is scale-pattern, vertical and horizontal. In this style we find nearly all B II, the rest of B III and the bulk of C, D, and E, 240 clearly Middle Chou vessels. Its coming coincides with a widening of Chinese culture and seems connected with an extension of Chou power just before its culmination under King Kung.

There are no purely Middle Chou vessels datable in or after the 6th century. About then took place a gradual transition to the style the Swedes call Huai after the river from which they obtained many specimens, but this does not imply that the Huai was the centre of its distribution. The Exhibition catalogue calls it the style of the Warring States: we used to call it Ch'in or Ts'in and thought it developed in that state a little before it attained supremacy *c.* 250 B.C. The new dating was established by Karlgren in his article on the Piao Bells in no. 6 of the Bulletin. The Huai style revived the vigour and many of the motives of the Yin style but continued the new shapes introduced in Middle Chou: it added ten new points of its own; most characteristic is the pattern of

'teeming hooks and volutes'. Karlgren enumerates some forty pure Huai vessels in classes C and D and another nine with a mixture of Middle Chou elements, but the Huai style lasted on into Han times beyond the scope of his paper.

I believe that Professor Yetts has come independently to very similar conclusions, and will set them out in his forthcoming book on bronzes.

Professor J. G. Andersson then gives a paper on 'The Goldsmith in Ancient China' with most interesting coloured plates. He shows that the inlaying of bronze with gold, silver, turquoise and malachite, which we used to think began in Han times, goes far back into Chou and perhaps Yin, so confirming Bishop White's dating of the 'Tombs of Old Lo-yang'. He traces what look like purely abstract motifs, which his drawings render with admirable spirit, back to bird and beast forms.

Professor O. Karlbeck, to whose travels we owe so many splendid pieces of Chinese work, illustrates clay moulds from An-yang and explains the technique by which they were used in casting the Chou bronzes, and gives pictures of pieces, almost unexampled, of stone sculpture from the same site.

The whole volume makes a most valuable contribution to our understanding of early Chinese art.

ELLIS H. MINNS.

LONDON AND THE SAXONS. London Museum Catalogues: no. 6. *By* R. E. M. WHEELER. *London: Lancaster House*, 1935. *pp.* 201, 21 *plates*, 1 *coloured, and* 45 *text-figures*. 1*s* 6*d*.

This is the sixth of the excellent London Museum catalogues which have been produced during the last nine years. In this, the latest addition to the series, the high level of scholarship and production which we have come to expect in them has been worthily maintained. Of the 200 pages rather less than half are concerned with the catalogue itself, the greater number of the first 113 pages being devoted to the question of the survival of London during the Dark Ages.

After a brief survey of the development of the Romano-British towns up to 410 and a description of the invaders, Dr Wheeler goes on to consider the nature of the available evidence. He points out that the documentary evidence is valueless. Nowhere is there any specific information as to the fate of London. But only in one case—the destruction of Anderida by Aelle—are we told of the fate of a Roman town. The vague assertions of Gildas who, moreover, is interested primarily in the West, may be discounted. Little reliance can be placed on Nennius, the precise date of whose *Historia Britonum* is disputed. But we can hardly agree with Dr Wheeler's sweeping generalization that 'disputed evidence is no evidence, and the only safe and scientific course is to reject it utterly' (p. 34). If we reject all disputed evidence we have practically no materials left for a history of England in the Dark Ages. Moreover, the precise value of much of the evidence brought forward by Dr Wheeler for the survival of London during this period may be, and in fact has been, disputed. We are not justified, therefore, in rejecting that evidence entirely.

Since no conclusions as to the fate of London can be drawn from the contemporary documents or from place-names, we must depend entirely on archaeology. Here Dr Wheeler pauses to discuss the value of such evidence. He emphasizes the fact that absence of evidence is not evidence of absence—a point which archaeologists in general are too apt to forget and a point which Dr Wheeler himself seems to forget later on. His main arguments for the survival of London may be summarized as follows. In the first place

the lack of pagan cemeteries within a radius of from 5 to 10 miles of London indicates that, during the pagan period, London still possessed enough power to keep the invaders at arm's length. But we find the same absence of archaeological evidence in Essex, which is shown by the place-names to have been one of the early regions of settlement. Whatever may be the reason for this lack of archaeological evidence in Essex—intensive cultivation, a change in the coastline since Saxon times or merely chance—yet with such an analogy we must admit that Dr Wheeler's first point is hardly conclusive.

Secondly, the system of Grim's Dykes which were probably constructed during the Dark Ages imply some power in the Thames Basin which can only have been that of London itself. The coincidence of the delimited area with that of the privileged territory of Medieval London seems to indicate a civic continuity. There is, too, some slight evidence for the occupation of London during the Dark Ages, since seventeen objects ascribable to that period have been found in the city. The importance of this is obvious when we realize that only three objects have been found which are ascribable to the seventh and eighth centuries, a period when London was, according to Bede, 'the mart of many nations'. Other factors such as the early coinage and the special legal traditions emphasize the individuality of the city but are not stressed, since, as Dr Wheeler points out, they are not necessarily evidence of continuity.

The skilful advocacy of Dr Wheeler is very convincing and it does seem probable that 'whilst the process of Teutonic settlement in the east midlands was largely one of *submergence*, in the southeast it was largely one of *mergence*'. It has been said that the strongest argument for the destruction of the towns of Britain in the dark centuries is the disappearance of the urban episcopate (review in *Times Literary Supplement*, 11 July, 1935). But we know little about the organization of Christianity in Britain during Roman times. Even if such an episcopate had existed it is not surprising that St. Augustine found no British bishop in London. By 600 the town must have been thoroughly Saxonized. A bastard Christianity may have lingered long but, cut off from contact with other churches, it must eventually have succumbed to the influx of heathen Saxons. The ease of the conversion at a later date is not evidence for the weakness of the pagan religion at the time of the Conquest. In any case it is incredible that a site such as that of London should ever have been abandoned, even if only for a short time. But whether the city was British or Saxon during most of the Dark Ages is difficult to say. The comparative frequency of Saxon objects ascribable to this period would seem to indicate that it soon became thoroughly Saxonized, probably by a process of mergence rather than of Conquest. In any case we must find it difficult not to agree with Dr Wheeler's very moderate statement of the case that 'the burden of proof rests today, not with those who hold that London lingered on without cessation throughout the Dark Ages, but with those who would maintain that the city 'lay waste a hundred years'.

In the Catalogue itself we are given valuable descriptions of the finds at the Mitcham and Ewell cemeteries and on the Hanwell and Savoy sites, together with a complete list of unassociated objects. In the appendix is a list of objects found in the city of London and Southwark and referable to the Saxon or Viking periods. These descriptions and the useful typological studies of Saxon scramasaxes and spearheads will prove invaluable to all archaeologists. As we should expect, the general production of the book is beyond criticism and the numerous plates and text-figures are excellent. There are, however, a few misprints which should be corrected in the next edition; note for example the Old English names of the Saxon towns captured by Cutha (p. 69, n.1). It is doubtful

whether Dr Wheeler's conclusions will command universal support. The evidence, though certainly suggestive, can hardly be regarded as conclusive. That, perhaps, is not to be expected. But, whatever their opinions, historians must remain indebted to Dr Wheeler for his very lucid discussion of the problem. R. M. WILSON.

DIE VOLKERWANDERUNGSZEIT GOTLANDS. *By* BIRGER NERMAN. *Stockholm : Kungl. Vitterhets och Antikvitets Akademien*, 1935. *With* 61 *plates and* 256 *text-figures.*

This is another of the fine archaeological publications which stand to the credit of the Swedish Academy, and carries on the high level of excellence which we have learned to expect from it. It is no light task to attempt the illustration and record of every known object from an island as large as Gotland belonging to the Migration Period. Dr Nerman limits this to the two centuries from A.D. 400–600. Mercifully for the author the material is by no means as plentiful as it would be if one were unfortunate enough to have to do the same thing for Kent or Suffolk, but it is a very great business and he is to be highly congratulated on his splendid work. If one may make a very small comment—not a complaint, but rather a plea to all publishers of similar reports—it is very much easier for a student to use a book of this kind if the descriptions of the objects are placed at the bottom of each plate and not in a list alone. This applies to works from every country, and it must not be thought that the reviewer is complaining of any one in particular.

Gotland, though comparatively small, is so situated in the Baltic as to catch the eye of any fleet passing up or down the coast of Sweden. It looks tempting enough when seen, as the reviewer has seen it, from the mast-head of a sailing-ship, to attract the attentions of any plundering force. We are therefore a little surprised to find that the fifth century there was a time of peace. Dr Nerman calls this century period VI : I. The theory which we see quoted at times by historians, that the Jutes who came to Britain in the fifth century were really emigrants from Gotland, has little support from the archaeological material figured in this book. There is hardly a single specimen in all the 878 illustrations, which might be mistaken for an object found in England. There is a veritable spate of small brooches, some of them having a strong superficial resemblance to Provincial Roman cross-bow types, although it is probably heresy to say so, while others seem to be in process of developing a disc on the bow, which was to become so noticeable in later years. Buckles and strap-ends are much in evidence, and one or two of the former would not be surprising finds in some of our Kentish cemeteries. Of the pottery we can say little; it is typical ' Migration Period ' pottery, ornamented with stamps of various kinds and often provided with spout-like handles. There are several glass beakers apparently imported like our own examples from Germany. Dr Nerman shows us that his second period VI : II, which roughly comprises the sixth century, was less peaceful, and there is much Swedish influence. There are numerous bracteates, and the beautiful large gilded brooches ornamented with chip-carving. One has a runic inscription, another, 354a, might almost be mistaken for an English example. Whereas the latest addition, text-figure 256, ornamented with garnets and animals in style I, is one of the finest barbaric brooches in existence.

Enough has been said to show that this work must be consulted by every serious student of the period, and while congratulating Dr Nerman on it, we look forward eagerly to the next. T. C. LETHBRIDGE.

LO-LANG : the Tomb of Wang Kuang. Detailed Report of Archaeological Research (in 1932). Vol. II, *by* T. OBA *and* K. KAYAMOTO. *Japanese text (pp.* 110). *English résumé pp.* 8, 100 *plates* (many coloured) and 12 *text-illustrations.* Keijo (Seoul) : *The Society of the Study of Korean Antiquities,* 1935.

This tomb, no. 127 at Teihakuri, is very similar to that called ' of the Painted Basket ' noticed in ANTIQUITY, June 1935, p. 251. As in the case of Wang Hsü's tomb (v. ANTIQUITY, 1931, p. 521) the dead man's seals give his name and office, Secretary to the Chief Inspector. It is surprising what elaborate tombs these minor officials could afford. The lady's body was very well preserved : her physical type suggests that she came from a distant part of China, but unfortunately the discussion of it is not reproduced in the English résumé. As usual the lacquer ware is abundant, one or two pieces of high quality showing the patterns whose genesis has been so well discussed lately by Professor Andersson in *Yin and Chou Researches.* The most interesting object is perhaps a cross-bow, with its trigger arrangement in position in its wooden stock. The brushes are amusing, three for cosmetics and one for writing. There were two good Han mirrors. Tomb 119 at Nan Seiri, with a stone chamber, was opened in the same year but proved almost empty. The publication is as perfect as can be. ELLIS H. MINNS.

THE MEGIDDO WATER SYSTEM. *By* ROBERT S. LAMON. [Oriental Institution of Chicago, publications, vol. XXXII]. *University of Chicago Press.* (*Gt. Britain : Cambridge University Press*), 1935. *pp.* XII, 38 *with* 8 *plates and* 30 *figures.* 13*s* 6*d net.*

The water-supply of a tell or hill-fort has always been a fascinating problem. In this pamphlet we have a careful study by competent archaeologists of the solution to the problem adopted at the very ancient site of Megiddo. A brief outline of the history is as follows :—The original settlement on a gentle limestone knoll was dependent for water on a surface spring at the foot. This spring dried up, owing to a fall in the water-table, probably brought about by deforestation. The water was followed by digging both downwards and laterally along a fissure, so that a cave-well was formed. As the tell grew upwards and the site became a fortified settlement, dependence on an outside water-supply accessible to besiegers became intolerable. The first remedy attempted was to construct a covered gallery leading to the cave from a point just within the city wall, but later a more ambitious scheme was put in hand. A vertical shaft was sunk in the centre of the city ; from this an inclined stair was cut, from the bottom of which a horizontal tunnel was driven through bedrock to the cave ; the opening of the cave was then walled up and concealed.

The main interest of the present publication lies in the careful exploration of the shaft and tunnel, the deductions as to method of construction, and the dating by archaeological finds. The shaft was sunk through roughly 12 metres of accumulated débris and 23 metres of rock, and the tunnel has a length of 65 metres. How the requisite depth for the shaft and stair, in order that the tunnel from the bottom should be at water-level, was determined is unknown. The direction in which to drive the tunnel was easily fixed. A line of sighting posts was run over the surface, and at the shaft two of these were plumbed down : these two points gave the backward direction. It is noteworthy that the square shaft was placed diagonally to the line, thus giving the maximum length for sighting. The resulting alignment was absolutely accurate, but the tunnel was begun from both ends simultaneously, and from the cave the line diverged

about 14 degrees from the true. A correction was made, probably by sound, the two tunnels were united and then enlarged, the final stage being the cutting of a water channel in the floor. The details of this work are shown by a number of plans and sections and some excellent photographs.

The archaeological finds were not sensational, but are sufficient to date the various stages with considerable accuracy, when combined with known history. Megiddo was besieged for seven months by Thutmose III and several times attacked, but not overcome, in the Amarna period. Some internal water supply must be postulated, but nothing is as yet known of this, or of the reasons for its abandonment. A bronze statue-base bearing cartouches of Ramses VI was found and serves to date the associated pottery, from which the shaft and tunnel can be assigned to his reign. The gallery is apparently not much earlier and is placed as early 12th century. Before the 11th century the floor of the inclined tunnel was cut away and the horizontal tunnel continued under the steps to meet the vertical shaft, making it possible to obtain water from the top of the shaft by a bucket and rope. Further slight modifications, such as the building of masonry stairs in place of the rock-cut steps, can be assigned to the Solomonic period in the 10th century, to the 7th century and finally to the Greco-Persian period in the 4th century.

Three plates are devoted to the types of pottery, all of which was fragmentary, and five more to small objects of bronze, glass, semi-precious stones, etc., found either on the works connected with the water-supply or in remains of buildings partially explored during the excavations. C. N. BROMEHEAD.

LA CÉRAMIQUE TRIPOLIENNE. *By* T. PASSEK. Bulletin [*Izvestiya*] de l'Académie de l'Histoire de la Culture Matérielle, no. 122. Leningrad, 1935. *pp.* 165 *and* 37 *plates*, 4 *in colour.*

I do not think that there has been an account of this culture as it appears on Russian soil since I made a short survey of it in 1913, but we have had treatment of it in Galicia and the Bukovina (Koszylowce, etc., and Schipenitz) and Cucutenĭ in Moldavia. Since I wrote there has been a good deal published on it in Ukrainian, especially in the *C.R. de la Sect. Archéol. Ans* 1925 *et* 1926 and *La Culture de Tripolie en Ukraine* I, Kiev 1926. Passek is entirely concerned with the way the splendid spirals that went right round the pots degenerated into a symmetrical and metopic arrangement of weak lines. Besides the polychrome pots, and those he calls monochrome which were nearly as attractive, some pots have the spirals incised; and there are other pots with a decoration of fluting or grooving. The interrelation of these series on various sites gives him a basis to establish three periods traceable over the whole area, a fourth peculiar to the Desna and Dnepr areas inland, and a different fourth period and a subsequent fifth on the Dnestr and along the coast. Period two corresponds to Cucutenĭ A, period four on the Dnestr to Cucutenĭ B. Chvojka's A is period three, his B period four on the Dnepr.

We do not see the culture coming into being (the best ware appears perfect and merely degenerates); it seems to have come from the west, lasted a couple of thousand years, based on the peaceable use of the hoe, and perished by the encroachment of the people who buried their dead crouched in barrows.

The coloured plates are really excellent and the others serve their purpose. But a complete study of the culture and its relations is still a desideratum. E. H. MINNS.

UKAZATEL RABOT GOSUDARSTVENNOY AKADEMIY ISTORIY MATERIALNOY KULTURY *Imeni* I. Ya Marra, *s.* 1921–1935 *gg. OGIZ, Moscow-Leningrad,* 1936. 3 *rubles.*

This 135th volume of the *Izvestiya* of the Academy of the History of Material Culture contains a list of the Academy's periodical publications, followed by a classified list of all articles published therein. The articles (including reviews) are grouped in thirteen sections—General, History of Primitive Society (*i.e.* Prehistory), of the Ancient and Hellenistic Orient, of Ancient Greece and Rome, of the Byzantine Empire, of Western Europe in the Middle Ages, and so on—and within each section by years. It thus provides a handy index to a large section of Russian archaeological literature since the Revolution. It does not of course cover the publications of the Ukrainian Academy, of the Academy of Sciences or of local museums.

KRATKIY OTCHET O RABOTE AKADEMIY V 1935 G. (*Leningrad,* 1936, 1 *ruble*) is a brief report on the work of the same Academy during 1936. Besides a summary of finances, publications, excavations, photographic and laboratory work and so on, the brochure gives in Russian an account of the structure of the Academy, and lists of its staff and of its foreign correspondents. We note that only three English institutions* are receiving its publications by exchange as against eight German and eight American institutions. V. G. Childe.

PREHISTORIC ASSYRIA: the excavations at Tell-Arpachiyah, 1933. *By* M. E. L. Mallowan *and* J. Cruikshank Rose. *Oxford University Press,* 1935. *pp.*178 *with* 22 *plates and* 79 *figures.* 21*s.*

When Dr Campbell Thompson, at Nineveh in 1932, sunk a shaft to the natural undisturbed surface-level so as to determine the succession of cultures at that spot, he found Samarra and Tell-Halaf ware in the lowest strata. He perceived the need of confirming these results by further investigations. The difficulty at Nineveh of reaching undisturbed soil, owing to the thickness of accumulated débris, suggested the idea of attacking a lower mound, and the choice fell on Tell Arpachiyah, a site less than four miles from that of Nineveh from the Tigris.

The direction of the excavations was entrusted to Mr Mallowan, who has now published a detailed report of his 1933 campaign. The mound of Arpachiyah is not more than 10.5 metres high and the excavations did not extend beyond a depth of 5.5 metres, within which limits the superimposed building-layers were recorded. If we examine these layers, beginning with the lowest (and remembering that there is plenty of room for about five more undiscovered strata below) we obtain the following results.

Strata 10–6. A culture characterized by the ware found at Tell Halaf, whose decoration, at first naturalistic (animals) and monochrome, gradually disappears, to be replaced in the sixth stratum by a stylized decoration (boukrania, for instance) and by polychrome ware.

Contemporary with this locally manufactured Tell Halaf ware there is also found, though only from the 8th to the 6th stratum (mainly in the 6th), imported Samarra ware,

* The Society of Antiquaries of London, the Hellenic and the Roman Societies.

generally in fragments. (Note that at Nineveh the Samarra ware begins much earlier, in the lowest stratum).

The strata below 10 to 7 have revealed a most curious kind of structure which Mr Mallowan calls ' tholoi '. These are dwellings consisting of a round room, built on stone foundations on which rest mud walls ; the form of the roof remains conjectural. These structures develop and improve as one passes from one stratum to the next. In stratum 7 there has been obtained the plan of a house of greater length than width, not facing on a court as is usual in southern Mesopotamia.

At the 5th stratum there is observed a change in the culture of Arpachiyah ; a people having the ware of Al' Ūbayd settled on the mound and occupied it by force, destroying the houses and tombs. The whole of this stratum, therefore, is full of the débris of the two cultures.

Strata 4–1 contain only remains of the Al' Ūbayd culture, including the characteristic monochrome ware with geometric decoration ; they correspond, in short, to the end of the Al' Ūbayd period which precedes that of Ūruk, but whose extreme end overlaps the beginning of the Ūruk period. One finds there, in fact, associated with Al' Ūbayd ware, the grey-brown ware and red (engobe) ware met with in the Ūruk stratum.

It has been remarked that Al' Ūbayd ware does not occur at Nineveh ; but one finds there (in stratum 4) the red (*engobe*) ware and (in stratum 3) the grey-brown ware belonging to the Ūruk period, which are associated in the upper levels at Arpachiyah with Al' Ūbayd ware ; thus the contemporaneity of these two periods is established.

In the upper strata (4–1) at Arpachiyah metal appears, but is rare ; at the top of the mound there was found a copper blade comparable with those found in the cemetery at Susa.

The houses are of more primitive construction in the Al' Ūbayd strata than in those of Tell Halaf ; made of mud or clay they are no more than huts ; but in strata 2 and 1 there were some crude bricks of plano-convex form. This type therefore appeared very early on certain sites (it was found in strata 4 and 3 at Nineveh).

Mr Mallowan, on account of the importance of the remains, considers that the strata of which the Tell Halaf deposit at Arpachiyah is composed, must represent a period of time at least double that of the Al' Ūbayd strata, and that the culture of Al' Ūbayd at Arpachiyah is lower than that of the south. He considers that a thousand years is not an excessive amount to allow for the extinction of painted pottery in the south, for the replacement of the button-seal by the cylinder-seal, for the transition from mud to plano-convex bricks through a stage of rectangular bricks (Riemchen), for the invention and development of writing ; the culture of Arpachiyah up to the 10th stratum would then cover the 4th millennium.

We can only refer briefly to the polychrome pottery, the real revelation of the excavation, of which many examples are exhibited in the Baghdad museum. They consist principally of bowls with both inner and outer surfaces ornamented in black, red and white on the yellow background of the vessel ; the decoration in geometric, consisting of triangles, water-lines, dots, quatrefoils ; the centre is usually fitted with a rosette almost identical with that which appears later as the Assyrian rosette.

The excavations of Dr Campbell Thompson at Nineveh made it desirable that confirmatory evidence should set the seal upon his results at Nineveh ; the work of Mr Mallowan at Arpachiyah has provided the desired confirmation and much more, in the richness and surprising character of his discoveries, such as the tholoi and the polychrome ware, the first yet found in ancient Western Asia. G. CONTENAU.

ANCIENT GAZA IV. *By* Flinders Petrie. British School of Archaeology in Egypt. *Quaritch, Grafton Street, London, W.*1, 1934. *pp.* 21 *and* 70 *plates.*

This volume records the excavations of 1933 and 1934. The brief text is mainly a catalogue of objects found ; it closes with a short review of the researches of eight years in Palestine. These researches the editor believes throw much light on the 15th and 16th Hyksos dynasties, and on the source and nature of these invaders. The researches are said also to have thrown ' much indirect light on the Scriptures ' which has resulted in ' generous grants where confirmation of the Bible is concerned '. It is to be hoped that archaeological research will not always have to depend for its upkeep on the character of its results. Reference is made to the fact that at Gaza ' the more advanced works of a higher civilization were imported from foreign lands which lay north '. It is suggested that this ' higher civilization ' is not farther off than North Syria and that ' a search up to that region ought to bring to light the seat of a great Asiatic culture of those ages '. It is doubtful if the origin of the obviously alien objects will prove to be a ' great Asiatic culture ', at least none more startling than the type of culture best seen at Ras Shamra. It is perhaps unwise to titillate the imaginations of the uninstructed in this way, for there is no room in the regions indicated for the discovery of a totally new civilization of the type beloved by the Press. The plates tell their own story, which is a profoundly interesting one, but hardly of a type to suggest new archaeological Eldorados. S. C.

HOMERIC ESSAYS. *By* Alexander Shewan. *Oxford : Blackwell*, 1935. *pp.* 456. 21*s.*

In this large volume Dr Shewan has collected his most important papers on Homeric problems, which have appeared in various learned journals over a long period of years. For the author developed his interest in Homer seventy years ago, and has for long been the doyen of Homeric scholars. He has seen several generations of Homeric criticism arise and fall, and in this book he treats each on its merits. The book is full of charm and written in a vigorous and fluent style. The author crosses swords with any who will cross them with him. His principal *bêtes-noires* appear as the reader progresses. This is no place to evaluate Dr Shewan's position as a Homeric scholar, nor does he give any hint that he expects so to be evaluated. But he stands clearly in the forefront of those Homeric students whose principal weapon is commonsense. For more sheer nonsense has been written by the professional hack-critics about Homer than even about Shakespeare. But for the former we have fortunately the valuable check afforded by archaeological evidence, while in the case of Shakespeare we do not even know the contents of his grave ! Dr Shewan, as one would expect from a scholar of his experience, draws deeply from the archaeological sources. On the whole he uses archaeological evidence well and with caution, unlike many Homeric scholars, who run amuck with a mere handful of sherds as stimulant. But Dr Shewan errs perhaps in the opposite direction. His scholastic training has given him a passion for that saddest of sports—the beating of dead dogs. He revels in the Ithakan problem ; the reader's mind whirls and is numbed by the terrific energy with which he demolishes the Leucadians. Asteris, Daskalio, and that dreadful sentence in the Odyssey where Ithaka is described as ' the last island lying over against the gloom ', whizz round our heads like controversial meteors. What, in the long run, is the solution of the Ithaka muddle ? the excavators of the island have done more in a season or two than has been achieved in a century of word-spinning. The discovery of the single potsherd inscribed ' Prayer to

Odysseus' in a sacred cave on Thiaki*, the pyres and pottery from Aëtos, and a sufficiency of Mycenaean material, explodes finally the Leucadian heresy. There is not the smallest difficulty for a reasonable man to accept Daskalio as a most admirable ambush—I would guarantee to hide a large galley behind it as long as there were a few bushes growing on it— and we are left only with Homer's muddled geography. For Homer, when he said that Ithaka was 'farthest to the gloom' of all the islands, thought that the Ithaka channel ran east and west, and saw that Ithaka extended out to sea. In any case if I were asked, after one visit, to describe the various parts of the islands of Delos and Rheneia and the odd islets round them I am quite certain that I should fail to remember quite important features and lose direction if I had no map to refer to. It is, after all, an experiment that anyone can try on the coast of Scotland or Wales—to write a brief epic about a given piece of coast and see what is forgotten in the geography. If only the Homeric scholars had been made to do this, much ink would have remained in the ink-pots. I fear I cannot agree with the author in his translation of *παντπετάτη*. I am sure that all Homer was trying to explain was that Ithaka was the last island on the west out to sea—just that and no more. But his memory and knowledge were poor. So too when he calls it 'low' he is right. Ithaka has high hills on it, but is quite over-towered by the other island. Here I am in agreement with Shewan, who says that 'from a distance' it looks low. It certainly does, and that is all that Homer meant. Again Dr Shewan is right in his clear distinction between Homer's 'fairy tale' geography and the geography that he knew in person or at good second hand. In the latter class we must place Ithaka and the Ionian islands, the north-east Aegean coast and the Troad, and the mainland of Greece as illustrated in the land trip of Telemachus and the Catalogue. All else is a composition of odd sailors' tales and merchants' stories gleaned from heaven knows where. Gibraltar glimmers once into view: the Black Sea and Sicily emerge as a traveller's tale; the remote Baltic—perhaps even Norway—masquerades as 'Telepylos of the Laestrygonians'. But the main distinction between real and unreal geography holds, and Dr Shewan has done a great service in making this point clear.

Scheria is to him quite definitely Corfu. Here too I agree. He might have made more of the famous 'petrified ship', the little islet offshore. Here, to me at least, is a valuable hint. Any such rock, anywhere in the world, at any age, would give rise to the local legend that once upon a time it was a ship that was struck by some magician into a rock. Such it must always have been called by the most ancient Corfiots. A poet goes to Corfu from Ithaka, sees the rock, hears the story, and at once places it in his story as the Phaeacian ship that was smitten by Poseidon. As though William Morris had incorporated in an epic some story of a 'Devil's Quoit' or an 'Arthur's Seat'. Normal poetic procedure—and, if you wish, proof that Homer went to Corfu. But *au fond* it is clear that archaeologists must carry out a campaign at Corfu to investigate its prehistoric and proto-Hellenic sites. Oddly enough this has never been done, though Dörpfeld claims to have found traces of Mycenaean settlement.

Dr Shewan mishandles his archaeological evidence in this context. He accepts the long-discredited 'Mycenaean settlement' at Torcello and is prepared to believe, with Evans, that the Corfiot pediment of the Gorgon has Minoan-Mycenaean features. It has none at all, and is pure Orientalizing Greek work in design and execution. Nor are his Minoan parallels for the 'golden youths holding torches' of the Palace of Alkinoos at all apposite. These very Victorian statues must remain in an archaeological vacuum,

* Described on p. 350 of this number, where it is published for the first time.

where they have always been. But Scheria is Minoan-Mycenaean in all certainty. Nilsson's contention that it represents a settlement of the early days of Hellenic colonization seems to me sheer nonsense. How, if that is the case, can he explain the matriarchal rule of Arete, or the thirteen princes (like the Mycenaean Kings of Cyprus) or the cyanus-bedecked palace with its megaron hall ? Orientalizing elements they may be which have, as everywhere in Homer, crept into his descriptions of earlier material settings. But the main shape and flavour of the land of Alkinoos is pre-Hellenic.

Dr Shewan's pages lead on both the reader and the reviewer. They are written with much skill and fluency and are rich in scholarly conjecture. His vigour and enthusiasm will give a much needed fillip to Homeric research. But I wish he had travelled more extensively in Greece and devoted his energies to excavation as well as to scholarly conjecture ! S. Casson.

DAS HEROON VON KALYDON. *By* E. Poulsen, E. Dyggve *and* K. Rhomaios. *Copenhagen : Levin and Munksgaard*, 1934. *pp.* 143, *with* 7 *plates and* 157 *illustrations. Price not stated.*

Near the city of Kalydon in Aetolia at the narrowing of the Corinthian Gulf is a small and neat *heroon*, surviving as a considerable ruin. This detailed and very fully illustrated report shows show the *heroon* is, architecturally, based more on the plan of a private house or a typical Greek gymnasium than on the plan of a religious type of building. The Casa del Fauno at Pompeii, the Prytaneium at Magnesia on the Maeander, and the gymnasium at Priene, or that at Epidauros, give close resemblances. An earlier building of Hellenistic date was reconstructed about the second century A.D. by the inhabitants of Kalydon, and the Greek style and shape was maintained.

The section-plan of the building is the most remarkable, for here are elements which suggest far more ancient parallels than the excavators adduce. The ground plan is of a large central courtyard with a peristyle and rooms opening off the central square, as in houses and gymnasia. But projecting from the inner side of one of the largest of these rooms is an apsidal cult-room with a basement room. In the basement room was the grave of the hero, approached by a flight of steps. The room over the grave was for ceremonial ; in front of this room was a further hall, forming part of the rectangular courtyard. The first comparison of the basement room and its first-floor room above is with the *adyton* in the temple at Delphi, and it may not be too conjectural to compare both with the new Temple-tomb at Knossos, where exactly the same features appear. All three give us examples of underground grave-sanctuaries (for at Delphi was the reputed grave of Dionysos) and all three follow exactly the same plan. The Greek *heroon* is all too little studied. Here we have what is virtually the first detailed study of such a building. There is no discussion or illustration of the *heroon* as a type of building in Robertson's standard work on Greek and Roman architecture, and none in Fyfe's ' Hellenistic Architecture '. S. Casson.

THE BIRTH OF THE MIDDLE AGES, 395–814. *By* H. St. L. B. Moss. *Oxford : Clarendon Press*, 1935. *pp.* xviii *and* 291 *with* 8 *plates and* 10 *maps.* 12*s* 6*d.*

This is an extremely good book. Mr Moss has set out to cover in a single volume of moderate dimensions the four and a half momentous and controversial centuries which separate the ancient from the medieval world, and he has succeeded to an extent unsurpassed by any similar undertaking in English. His work may not contain much that is

new or that can be described as the outcome of original research, but it passes the severest test applicable to works of ' high vulgarisation ' in its comprehensive grasp of recent contributions to a great variety of subjects, its emphasis throughout on the significant and its general balance and cohesion as a whole. It is also very well written, and though much of the material has necessarily to be presented in a highly compressed form, Mr Moss is never unreadable and hardly ever uninteresting. It is a book which should be equally stimulating to the novice in this period, and to its more hardened students, and the illustrations, each of which does definitely illustrate a sentence or paragraph of the text, and which range in date from a Sassanid relief of the third century to the Carolingian or later Torhalle at Lorsch, and in distribution from an Indian minaret to the Bewcastle cross, are chosen with judgment and avoid with equal skill both the hackneyed and the irrelevant.

The arrangement of the book serves to bring out Mr Moss's standpoint. It falls into four main parts: Romans and Barbarians; the Triumph of Justinian; the Onslaught of Islam; and the Age of Charlemagne; and while within these broad divisions some sections are rather curiously distributed—it is a little odd for example to find the Anglo-Saxon Invasions and the end of Roman Britain discussed not in part I, but as the opening section of the Age of Charlemagne—and while in view of Mr Moss's own words on pp. 109, 116, and 123–4, the word ' Triumph ' may seem hardly appropriate as applied to the work of Justinian, yet the treatment is well-balanced and Mr Moss seems equally at home in describing the origins of Islam and discussing the growth of the Papacy. He pays perhaps less attention than it deserves to the all-pervading importance of doctrinal questions in the mentality both of east and west: thus though he rightly speaks of Augustine as one ' whose influence on the Middle Ages can hardly be overestimated ' (p. 13) we look in vain for any adequate exposition of the conceptions which made that influence so incalculably great; and it may perhaps be taken as symptomatic of the same weakness that Mr Moss should characterize the Easter controversy between the Celtic churches and the Roman mission in the seventh century as merely an example of ' minor, though controversial differences ' (p. 208): in fact, of course, in an age in which every year was dominated by the regular and momentous sequence of the greater fasts and festivals, the mere existence of such a controversy seemed to dissolve the very foundations of the Christian life.

But a work of this scope can hardly expect to maintain an equally sure touch on every topic: it is greatly to Mr Moss's credit that the chinks in his armour—like the misprints in his book (p. 97, 553 *for* 533: p. 208, Columban *for* Columba)—should be so few. One can only end by repeating that he has given us an extremely good book.

J. N. L. Myres.

MONUMENTS MESOPOTAMIENS NOUVELLEMENT ACQUIS OU PEU CONNUS. *By* G. Contenau. *Paris: Musée du Louvre.* Les Editions d'Art et d'Histoire, 1934. *pp.* 27, *with* 15 *plates and* 7 *text-figures.* 30 *francs.*

Those interested in Mesopotamian art will welcome this important series of publications with illustrations of large and small sculptures ranging from the Sumerian and the Akkadian to the Achaemenid periods. Many of the objects, in themselves of great importance for the history of art in Western Asia, are adequately illustrated for the first time: throughout the book Dr Contenau appends learned comment, and indicates analogous material.

When we examine the sculpture of the Sumerian and Akkadian periods we realize how much we have still to learn about the development of the arts in those times, especially about the turn of the older Sumerian and Akkadian periods ; and indeed even the Gudea statues of the 25th century seem to carry on the older pre-Akkadian tradition. Thus the limestone statuette of Sa-Oud, apparently just pre-Akkadian, certainly gives us a foretaste of the later Lagash statuary (*e.g.* the famous British Museum Patesi of Lagash), whereas the statue of the grandfather, Lugal Kisalsi himself, seems to be in closer touch with the Ur Nina tradition.

Many of the objects illustrated suggest interesting comparisons with other material. The limestone plaque on pl. IV of about the time of Ur Nina—with a lion-headed eagle standing on two lions—reminds us of the Al 'Ubaid Im Dugud relief. The statuette of a Sumerian woman shown on pl. Vb is ascribed to the Akkadian period : there are parallels from Ur which could certainly pass as third dynasty. Plate XI, a and c, show two gems of animal carving of about 3000 B.C. in white marble and limestone respectively, all too little known. One of the most brilliant pieces in the whole collection is a fragment of a vase in a brown stone, pl. XIIb, showing a prisoner with his hands bound and the man himself noosed and corded like a bull. I doubt whether this masterpiece of the Akkadian period is known to more than a few Mesopotamian archaeologists.

On pl. XIId there is shown a remarkable relief of ' Gudea libateur ' where the patesi is figured as pouring a libation onto a palm rising from a vase which stands upon a curiously decorated pedestal. Dr Contenau quite rightly insists that the pedestal is an altar and there is precise evidence to prove the correctness of his view, for at Ur, in houses of the Larsa period *c.* 2000 B.C., the private chapels contained low altars of the kind figured on this monument, built of mud with decorated facades coated with plaster. Sometimes the offerings remained in position upon them. All the more interesting therefore are the author's comparisons of similar monuments of the Assyrian period at Ashur, also at Fraktin and Boghaz Keui. It is to be hoped that Dr Contenau will continue to give us further numbers of the less known Monuments Mesopotamiens.

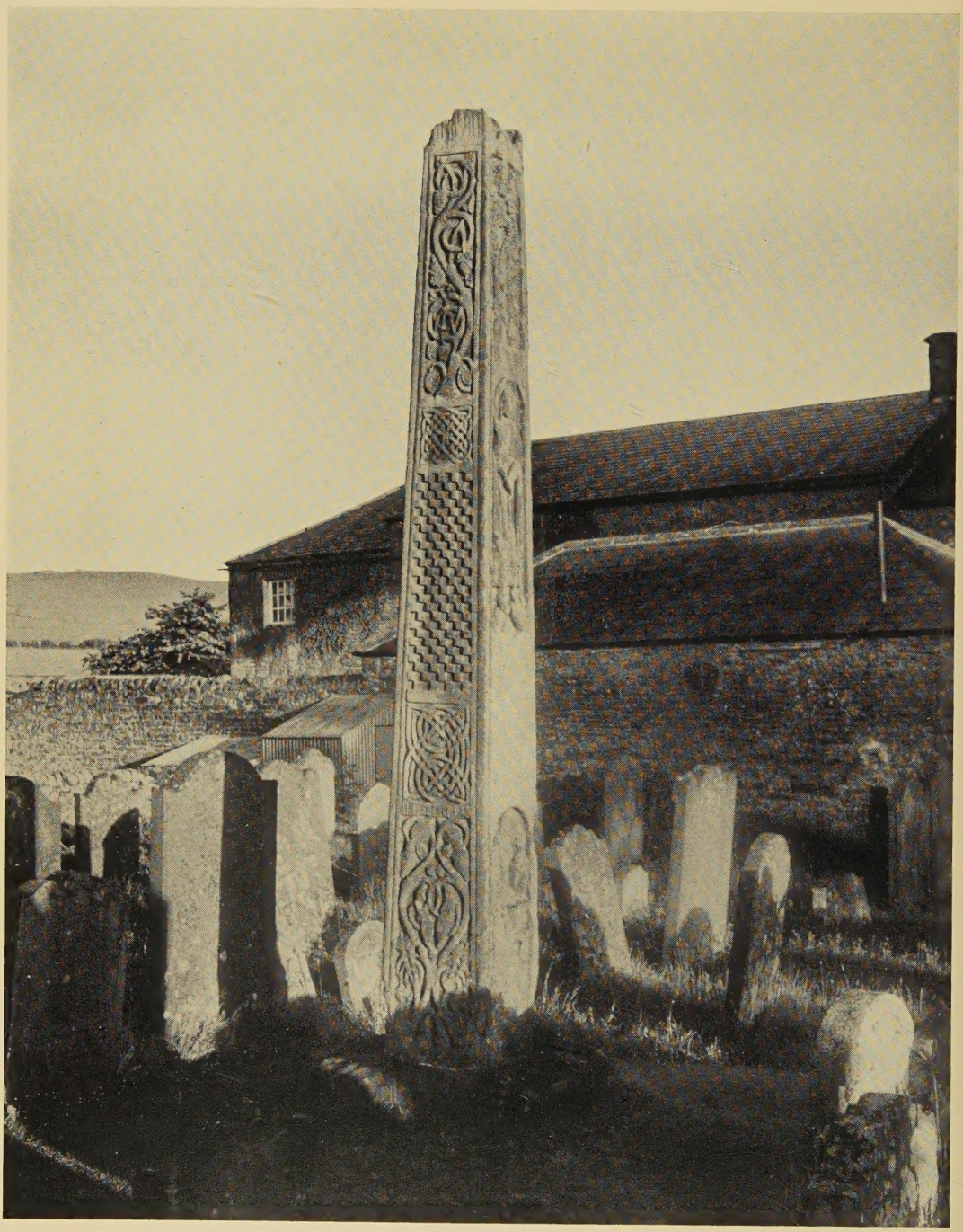
M. E. L. MALLOWAN.

HANDBOOK OF TRAVEL. Prepared for the Harvard Travellers Club. Edited *by* GEORGE CHEEVER SHATTUCK. 2nd edition, 1935. *Harvard University Press, Cambridge, Mass. ; Oxford University Press, London.* 12*s* 6*d.*

A comprehensive handbook for the professional traveller. The book is divided into four sections :—methods of travel ; camping ; recording and collecting ; hygiene, medicine and surgery. The first covers a wide range—from the motor to the camel-caravan. The second includes a useful list of edible plants. The third contains, in addition to the usual directions for collectors, a long chapter on photography, and one on the elements of practical archaeology. In the last section, some 100 pages are devoted to careful instructions to travellers on the treatment of diseases, etc.

The book is well written and arranged, and each chapter is followed by an adequate bibliography. Perhaps more use might have been made of illustrations ; those given are good.

MERIC DOBSON.



BEWCASTLE CROSS: NORTH FACE. (*See* p. 436)
Ph. O. G. S. Crawford, 1936